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Railway Age

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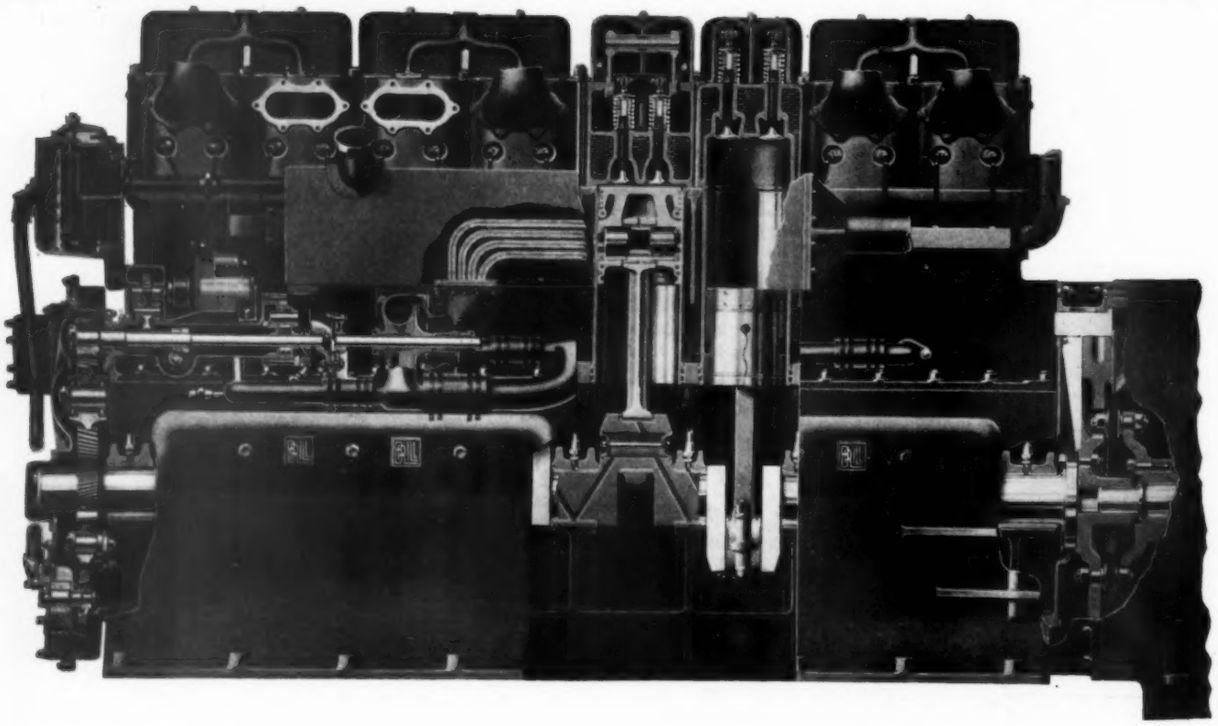

Railway Age

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Huge Benefits to Manufacturers from Improved Railway Service

THE best evidence that has been made public of the value to general business of the improvement in railway service has been furnished in a statement recently issued by George R. Meyercord, formerly president of the Illinois Manufacturers' Association. It is the best because it is comprehensive and specific, and especially because it affords a basis for measuring in money the value of the benefits being received from improved railway service by the entire manufacturing industry of the country.

Mr. Meyercord's statement summarizes the facts ascertained by a survey of the inventories carried in 1920 and in 1929 by the manufacturers of Illinois. The total sales of the manufacturers of that state in 1929 amounted to approximately $6,000,000,000. On October 1, 1920, their stocks of raw materials had a value equivalent to 11.4 per cent of their total sales in that year, and their total inventories—including semi-finished and finished products as well as raw materials—had a value equivalent to 20.2 per cent of their total sales. On November 1, 1929, the stocks of raw materials carried by them had a value equivalent to only 5.46 per cent of their total sales in 1929, and their total inventories were but 13.23 per cent of their total sales last year.

Computations based upon the foregoing figures show that if in 1929 Illinois manufacturers had carried stocks relatively as large in proportion to their sales as they did in 1920, their inventories of raw materials on November 1, 1929, would have been $684,000,000, and their inventories of finished products $528,000,000, a total of $1,212,000,000. Actually, however, on November 1, 1929, their inventories of raw materials amounted to only about $327,600,000, and their inventories of finished products to about $466,200,000, or a total of less than $794,000,000. Therefore, Illinois manufacturers accomplished the equivalent of a reduction of almost $420,000,000 in their inventories.

As Mr. Meyercord points out, it is reasonable to assume that manufacturers throughout the country have made as large reductions in proportion to their sales as have those of Illinois. The total sales of all the manufacturers of the United States in 1929 are estimated at $70,000,000,000. On this basis the reductions of inventories since 1920 have been equivalent to a decline from $7,980,000,000 to $3,822,000,000 in raw materials, and from $6,160,000,000 to $5,439,000,000 in semi-finished and finished products. On the basis of the ratios of inventories to total sales in 1920, total inventories of the manufacturing industry in 1929 would have been about $14,140,000,000, while on the basis of the ratios of inventories to sales that actually prevailed in 1929 inventories aggregated about $9,261,000,000, the total decline being equivalent to a reduction of about $4,879,000,000.

A $5,000,000,000 Reduction in Inventories

If we assume that the annual cost of carrying stocks averages 25 per cent of the investment in them, the annual saving effected by the manufacturers of the country as a result of this reduction of inventories is about $1,220,000,000. This is equivalent to a reduction of more than 25 per cent in all the present freight rates of the railways. Business concerns of numerous other kinds besides manufacturers—including for example, all those who produce fuel and other raw materials, and all engaged in wholesaling and retailing—have made reductions in inventories as large relatively as those made by manufacturers. Not only has this been shown in a series of articles recently published in the *Railway Age*, but it has also been shown that industrial and commercial concerns have derived numerous other benefits from improved transportation besides those resulting from their ability to reduce their inventories. The *Railway Age* estimated in a recent editorial that the benefits derived by general business from the improvement in railway service since 1922 were equivalent in annual value to at least a 30 per cent reduction in present freight rates. In view of the information which has been compiled by the Illinois Manufacturers' Association it would appear that this estimate is much too low.

Of course, it cannot reasonably be claimed that the entire reduction in the inventories of industrial and commercial concerns has been due to the improvement in railway service. It has been due both to this and to improvements in the management of industrial and commercial companies. But business men generally concede that without the improvement in railway service it could not have been accomplished; and to railway service, therefore, must go the lion's share of the credit for it.

Mr. Meyercord emphasizes a difference between the situations existing following the recessions of business in 1920 and in 1929 which is of great importance. This is, that in 1920 the stocks of raw materials carried by manufacturers were sufficient to have enabled them, without making any purchases, to carry on their operations more than four months, while the stocks carried in the latter part of 1929 were sufficient, without any purchases being made, to have enabled them to keep their plants in operation only five or six weeks. It follows that the present business recession must be briefer than was that which began in 1920, because even if consumers should reduce their purchases relatively as much as they did then the stocks of both semi-finished and finished products and of raw materials carried by manufacturers would much sooner be depleted to a point where they would have to increase production and buy more materials.

Does Business Want This Kind of Service?

In view of all the evidence that business men themselves have made available within recent years regarding the benefits of fast and dependable railway service, it seems strange that the country should be in the midst of an unprecedented agitation for the development at public expense of means of transportation incapable of furnishing the kind of service upon which the economic welfare of the country now depends. The motor truck can play an important part in rendering the kind of transportation service that prevailing business conditions and methods require. But what part in rendering such service can be played by carriers on rivers and canals? As has been repeatedly shown in the *Railway Age*, even the claim that improved rivers and canals will "cheapen" transportation cannot be substantiated if in the cost of water transportation be included the taxes paid by the public for providing it. In point of speed and dependability, the service rendered by carriers on rivers and canals must always be greatly inferior to that rendered by the railways.

Are the industrial and commercial interests of the country going largely to forego the advantages of good transportation service by diverting a large part of their traffic to inland waterways? If they do they will divert earnings from the railways that are needed to enable them to continue to render good service. If they do not, most of the public's money that is invested in inland waterways will be wasted, as it always has been. It is a notable fact that extremely few heads of large business concerns or their traffic managers are publicly participating in the agitation for large expenditures on rivers and canals. Most of the principal protagonists for inland waterways are public officials or employees of waterway organizations. If the development of waterways will divert a large amount of traffic from the railways it is a menace to good railway service. If it will not, it is a menace to the taxpayers.

The industrial and commercial concerns of the country which are now deriving such great benefits from good railway service, pay a very large part of all taxes; and because of their interest in both railway service and taxes it seems high time that, through the Chamber of Commerce of the United States or some other channel, they should definitely make known their attitude toward the inland waterway movement.

Free Transportation for Regulatory Authorities

IT was not so very long ago that the combined efforts of railroads and regulatory authorities resulted in reducing, to a very considerable degree, the amount of free transportation granted by and demanded of the railroads. It was within the last year that the Interstate Commerce Commission issued its order forbidding the movement of private or business cars off of their home lines except upon payment of regular rates—an order which may be taken as a fair measure of the Commission's attitude toward the burden which free transportation imposes upon the railways.

Yet now, during the present session of Congress, a bill has been introduced by Senator Smoot (Utah) and Representative Colton (Utah) which would permit the roads to give free transportation or reduced rates to members or employees of state railroad commissions when traveling on official business, wherever the granting of such free transportation is not contrary to state law.

Existing conditions, with free passes confined to bona fide railway employees and their families, are, admittedly, subject to occasional abuse. But at least, they are far superior to those of thirty and forty years ago, when almost any shipper, almost any friend of a railroad officer, almost anyone, in short, who could claim any connection, however remote, with a railroad, could obtain free transportation for himself and his family, on business or pleasure.

Under the Smoot-Colton bill, however, it is not difficult to foresee that state laws would speedily be amended to permit the staffs of their regulatory commissions to accept such free transportation, nor is it any harder to

see that the railroads would on demand, if not voluntarily, give such free passes as might be requested. It is equally easy to visualize a condition under which those thus entitled to passes would demand it when traveling, not only on commission affairs, but on private business, or even on pleasure. A logical corollary of this act, too, would be to extend free transportation to members and employees of the Interstate Commerce Commission, and perhaps, eventually, to grant it to officials and employees of other branches of the state and federal governments.

Such legislation, if passed, would not only represent a backward step in the history of the long effort to control the use of the free transportation privilege, but it would add materially to the chances for abuse of that privilege, and would open the way to further abuses. It would not only tend toward a further reduction of passenger revenues, however slight, at a time when those revenues are already low enough, but it would also throw upon the railroads the burden and expense of carrying, free or at reduced rates, the very people who are employed by government to regulate those same railroads.

A thin disguise of legality and public interest is hardly sufficient to hide the evils inherent in any such attempt to restore to the free transportation privilege the abuses involved in it years ago or to force the railroads to pay, even indirectly, more than they now do pay in taxes for the privilege of being regulated by government commissions.

Education and the Railroads

LEARNING to do one job and doing it better than most others, an old formula for the achievement of success in business, is not as sure a guide as once it was. It is true that knowing the job well is just as important as ever, but we have today to face the further fact that a demand for men trained to specific vocations may diminish or disappear over night. Economic changes in earlier days came more slowly. A new invention or trade practice destined to have a profound effect on occupations and manner of living came in slowly enough so that it was not necessary for the old dog to learn new tricks in the middle of his active career. The newer entrants into industry learned the new jobs and, so gradual was the change, there remained plenty of the older way of doing things to keep the older men busy.

Changes come with more rapidity now and problems arise to perplex the man who thought his period of apprenticeship and education was definitely a thing of the past. The railways afford many outstanding examples of such changes, technical as well as economic. It would have been difficult before the war to have imagined that the problem of the passenger department, for instance, would be what it is today—a matter of readjustment of services to meet changed demands and of stimulating traffic by sales methods to meet a new competitor. Mechanical methods have replaced manual operations in many lines of railroad work, calling for men skilled in different occupations and for the application of different economic principles.

If there ever was a time—and of course there always has been—when there was a need in the railroad business for men of broad and continuous education, it is the present. The man alert to the changes which are taking place about him and to the changes which may take place will not only be able to look out for his own best interests, but he will also be an asset to the railroad in helping to keep it in pace with, or a little ahead of, the times. When we speak of education, we do not mean college education necessarily. That has its advantages, to be sure, but it may also have its disadvantages, particularly if, as sometimes happens, it gives its graduate the notion that his education is complete with the receipt of his diploma. We refer rather to the training of the employee and the officer in their jobs and to their constant acquisition of general knowledge so that they may know, not only what is likely to take place within the industry, but also what changes going on elsewhere may affect the railroad industry and their jobs.

It is men of such education and foresight as this who have brought about the great improvement in railroad efficiency in recent years and enabled the railroads so successfully to meet modern conditions of competition in transportation. And yet changes never cease. The next decade may see developments quite as startling as those which the one just past has witnessed. Any step taken by railroads, therefore, to stimulate education and the development of judicious foresight on the part of their officers and employees is a measure for the protection of investment in railroads and is hence a legitimate and profitable activity.

Supply Handling in Winter

RAILWAY executives nowadays are greatly interested in material. The war period taught them how quickly and enormously supplies can pile up. The financial difficulties facing many roads following the war impressed upon them how beneficial it is to keep the piles down. They know that all material around the storehouse costs money. They know it costs to pile it there, to keep the books on it and to unpile it when somebody wants to use it; and all the time it lies there they know it is eating up interest that could have been paid for something else, and also that depreciation and obsolescence are busy all the time. When the opportunity is presented, therefore, executives and de-

partment heads very properly make speeches about the importance of economy and care in supply work, and when the warm and dry days of spring and summer find them touring the properties, the storehouses and store yards command their attention. The condition and amount of unapplied materials, and the care they receive, are noted, and any evidence of inattention or waste, whether by storekeepers, shop forces or track forces, is quite likely to subject the offenders to unpleasantries.

How many of these officers take a corresponding interest in the subject in the winter? The conditions under which stores are operated during this season leads one to believe that the interest and attention are small. A great deal of material throughout the country is stored in the open. Some of it is platformed. More of it is on the ground. This may be all right in the summer, but when winter comes it means that thousands of dollars worth of material is covered by snow. Storage yards have been seen this season completely hidden except where some of the material may have been dug out to show that it was actually there. It is true that some of the material stored outside is not injured by snow and water, but one has only to inspect the typical storage yard to know that this is not true in all cases.

It is surprising how much material stored in the open is subject to marked deterioration by weather, and this does not include the large stocks of lumber which, when saturated with moisture from melting snow, take that much longer to season. But deterioration is not the only problem that confronts the storekeeper in handling material stored outside. His principal problem is the inconvenience and cost of handling it. Over a large part of the country the snow is not fleeting. It comes and stays for weeks at a time, then melts and leaves the surroundings wet and soggy. It is a source of discouragement to any organization to face such conditions, to say nothing of the cost involved where material must be dug out and roads constantly kept open with inadequate facilities in order to maintain the supply service on a high standard. Better protection should be provided to meet the winter conditions faced by storekeepers.

Is the Preservation of Timber Worth While?

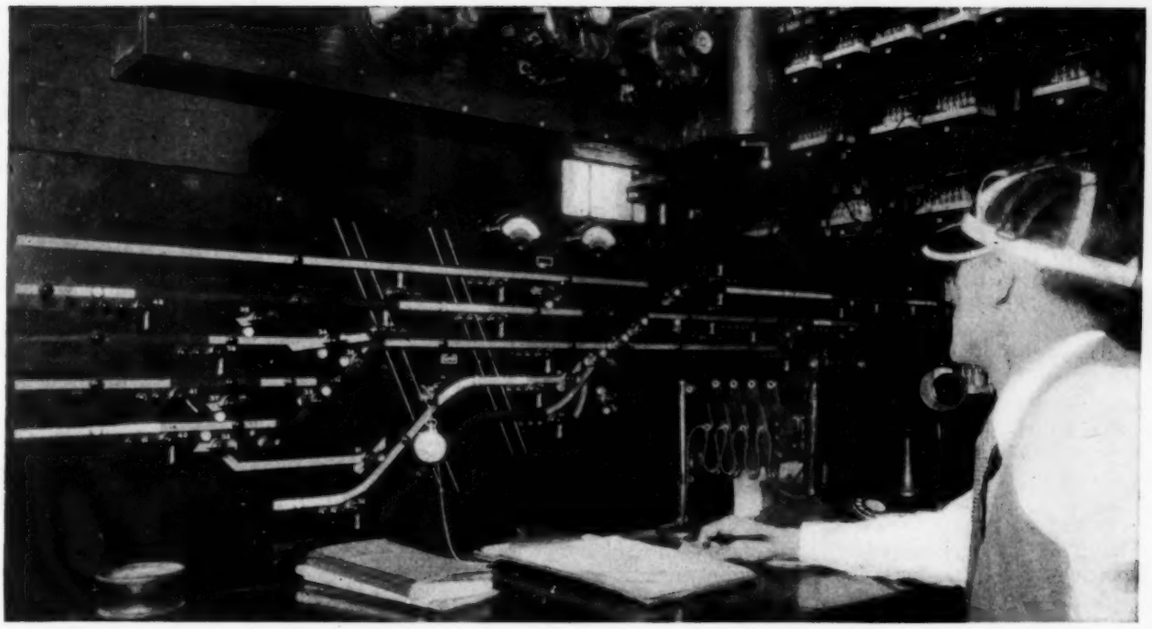
THE railways have always been one of the largest users of timber. They take for their various requirements more than one-seventh of the entire timber output. Of their different applications ties bulk largest, totaling more than 85,000,000 annually. The railways spend more for ties than for any other single material, excepting fuel.

Because of the magnitude of the outlay for ties, it is not surprising that the railways have pioneered in the development of the science of timber preservation and that it has been built up primarily around the treatment of ties. Even today, ties comprise more than two-thirds of all of the wood treated, and poles and bridge and miscellaneous timbers for railway use represent a large part of the remainder. That timber treatment has demonstrated its merit is evidenced by a comparison of the tie renewals made per mile of track maintained on those roads which have pioneered in this field with those of other roads which have not yet undertaken timber treatment or have adopted it only within recent years.

Such a comparison is afforded by data presented by the Committee on Tie Service Records at the recent convention of the American Wood-Preservers' Association and abstracted elsewhere in this issue. These figures show that the average annual renewals of different roads over a period of five years vary from 88, 93 and 125 on the Lehigh Valley, the Delaware, Lackawanna & Western and the Atchison, Topeka & Santa Fe, respectively, to as high as 287 and 298 on other roads. The records of those roads which have made the greatest progress show that it is entirely practical, by means of treatment, to reduce the renewals of the average road one-half to two-thirds, and those roads which were among the first to treat their ties are now reaping the greatest returns.

However, ties constitute only one of the large railway requirements for timber. The roads also use large quantities for bridge and building construction, for cars, etc. Wherever, in these applications, the timber is exposed to the weather, it is subject to the same decay as ties, and preservation affords the same increase in resistance to decay. Some roads have already recognized the possibilities of treatment for their bridge materials. A still smaller number are experimenting with treated timber in car construction. The progress in the preservation of timber for these miscellaneous uses is, however, much slower than is warranted by the economies possible. There are obstacles to the preservation of such timber, such as the necessity of framing before treatment, the use of non-odorous and non-staining chemicals in certain types of car construction, etc. These conditions, however, present problems which can be solved with proper effort. They are far less intricate than the problems which confronted those who pioneered in the treatment of ties.

The economies of timber treatment have been so thoroughly demonstrated that they are no longer open to question. With such outstanding evidences on their own properties, there would appear to be every incentive for progressive railways to subject to critical analysis every application of timber that is exposed to decay to determine whether the same economy cannot be effected there.



The New Type Machine is Compact and Easily Operated

Rock Island Develops Interlocking With no Mechanical Locking

Levers for switches and signals form a part of track diagram —First plant of its kind

By Leroy Wyant

Signal Engineer, Chicago, Rock Island & Pacific

A 42-lever electric interlocking plant embodying a new and novel type of control machine, has recently been placed in service by the Chicago, Rock Island & Pacific at Blue Island, Ill., near Chicago. This development is the result of an effort to accomplish three major things: (1) To secure a simple assembly of levers so that the leverman could sit at a desk and operate a maximum-size layout, while using the telephone or making records of train movements; (2) to reduce the size of the machine to the absolute minimum so it could be housed in a small space, and; (3) to provide a self-indicating arrangement so that anyone familiar with ordinary railroading could operate the plant and know by glancing at the board, exactly what route was lined up and the location of every train within or approaching the plant.

The two fundamental departures from the conventional type interlocking embodied in this new machine are: (1) The customary mechanical locking between levers, as well as electric locks on the levers, have been eliminated, the locking being accomplished by circuits especially designed for this purpose by the railroad; (2) the levers themselves are mounted on the illuminated track diagram, the switch and crossover levers appearing as short sections of the track, and the signal levers resembling semaphore blades. The interlocking machine is, therefore, a unique development and is believed to be original, having been developed by the signal department through the coöperation of the Chicago Railway Signal & Supply Company (now Railroad Supply Company) and the Automatic Electric Inc. Although the interlocking machine represents a new development, practically all of the detail pieces of apparatus involved are standard devices which have been developed and used extensively for years by the Automatic Electric Inc., in the automatic telephone field.

The Track Layout and Traffic

The complicated track layout and the diversified traffic involved, introduced several problems in the development of the plant. Heretofore, some of the main-line switches had been handled by switchmen, while the yard switches were handled by trainmen. This method not only caused delays and train stops, but necessitated slow speeds in this territory which intro-

The Power Switch Layouts are Fitted with Heavy Plates and Adjustable Rail Braces

duced delays to other trains and blocked the street crossings.

All of the road freight trains from the west terminate, and all but one of the freight trains leaving for the west originate, at the large yard and engine terminal just east of the new interlocking. Also the double-track suburban line; which runs from Chicago via Gresham and Beverly Hills, joins the double-track main line just west of the Blue Island station, and the suburban coach yard lies alongside the freight yard. At a point one mile west of Blue Island there is a junction switch leading to a transfer connection to the Indiana Harbor Belt Line and the Grand Trunk Western. All of these various junction and yard entrance switches and crossovers, as well as the signals involved, are included in the new plant. In addition, a system of either-direction operation by signal indication, on one track of the main line, extends from this point west, a high-speed, main-line reverse crossover for this service being included in the plant.

In addition to the 163 regular trains passing through this plant there are also numerous switching and transfer movements, as shown in the table, so that the total average daily traffic is 494 movements. Because of the simplicity of the operation of the control machine and the rapidity with which lineups can be made, this new type of interlocking is particularly adapted for complicated layouts, handling heavy traffic such as is involved in this plant. The operation rendered since the installation was placed in service on December 29, through one of the most severe winters in history, has been entirely satisfactory.

Features of the New Interlocking Machine

The compactness of the new type machine is evident from the illustrations. In order that the towerman may determine at a glance the location of a train, each of the various track sections on the diagram is painted a distinctive color, the lights in a track section being illuminated when the corresponding section is occupied by a train.

The levers form a part of the illuminated track diagram, each lever being mounted on the diagram in the position corresponding to the location of the respective function on the ground. The switch and crossover levers appear as short sections of the track, being pivoted at the center, and painted the same color as the track section in which they are located. In the case of a main-line crossover, for example, one half of the lever is the same color as the eastbound track section and the other half the same color as the westbound track section in which the crossover is located. White indicator lights are provided to show whether the switch on the ground moves to conform to the position of the lever. Two separate lights are used for this purpose, being so located on the diagram that in either position, the blade of the switch lever conceals the one that is not to be lighted and exposes the one which should be lighted to correspond to the existing position of the lever. This arrangement centers the attention of the towerman on the one light with which he is concerned at that time.

Traffic Through the Plant on January 26

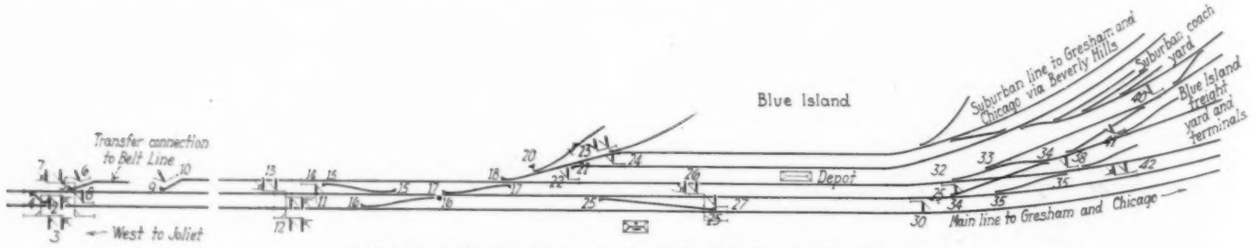
6	Passenger trains via suburban line to or from the west
48	Passenger trains via main line to or from the west
19	Road freight trains into and out of the yards
77	Suburban passenger trains originating or terminating via suburban line
15	Suburban passenger trains originating or terminating via main line
298	Switching moves
31	Interchange movements to or from the G. T. W. and I. H. B.
494	Total ordinary daily traffic

The signal levers are likewise mounted on the track diagram, being located in the position conforming to the location of the corresponding signal on the ground. Each signal lever is a short arm resembling a semaphore blade, and is painted yellow corresponding to the standard semaphore. Small lights repeating the indication of the signal are mounted close to each signal lever. For repeating the stop indication of all signals a red light is illuminated, while for indicating the proceed indication, a yellow light is illuminated for a slow-speed signal and green for a high-speed signal.

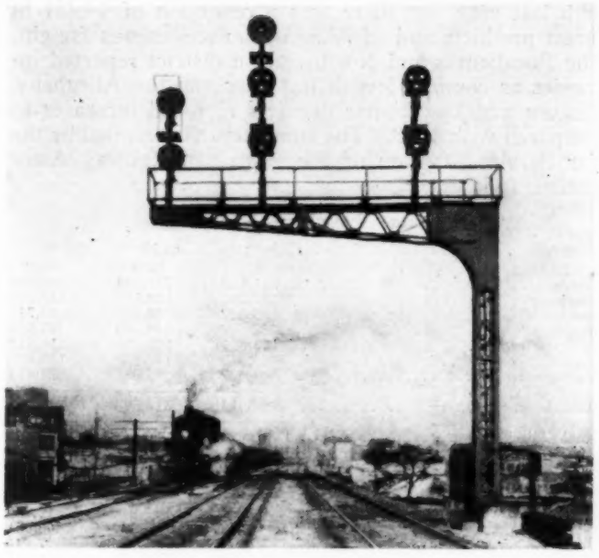
With the control machine constructed as just explained, a leverman sitting at the desk can easily reach and operate any of the levers without leaving his chair, in fact one man could handle a much larger layout. As there are no mechanical locking or electric lever locks, the leverman can operate the switch levers in any sequence that he may choose, thus eliminating any delay in waiting for each switch to go over and indicate. No manipulation chart is needed, for the diagram is a duplicate of the tracks themselves, and the leverman can readily follow the track to move the switches thus setting up the route he desires.

Basis for Eliminating Mechanical Locking

Prior to the use of electric circuits, mechanical locking between levers in an interlocking machine was essential to insure that the switch levers were lined up to complete any certain route and that signals for conflicting routes could not be cleared simultaneously. However, electric locking, as originally developed to accomplish results that could not be obtained with


Blue Island
Suburban line to Gresham and Chicago via Beverly Hills
Suburban coach yard
Blue Island freight yard and terminals
Transfer connection to Belt Line
Depot
West to Joliet
Main line to Gresham and Chicago

Track and Signal Plan of the Blue Island Interlocking



A View of the Eastbound Home Signals

mechanical locking alone, not only duplicated the protection afforded by mechanical locking, but also provided additional safety features. We consider that the mechanical locking is not only unnecessary, but also undesirable, therefore, it was eliminated at this plant.

Further, it should be noted that no electric lever locks are used on this machine, the detector, route, and approach electric locking being effected by controlling the circuit for the relays which control the individual functions. This new arrangement thus effects the most direct protection, rather than depending on an electric lever lock to prevent the operation of a lever which in turn has direct control of the function. The ordinary electric detector and release route locking circuits have been augmented by special protective and checking circuits which, however, we now consider desirable on any plant. A unique circuit arrangement provides that if a switch lever should be moved purposely or inadvertently when the route locking is in effect, that switch instantly becomes "dead" and so remains until the lever is restored to its proper position, all signals directing movements over this switch are placed at the stop indication and the time release has been operated.

Details of Construction

Among the other advantages of this new type of control is the fact that the interlocking machine requires only a small floor space, thus reducing the size of the tower building and the land area required for the tower. Therefore, the tower constructed at Blue Island is considerably smaller than our former standard for a plant of this size.

The power switch machines are the Union Switch & Signal Company's Model M-2 equipped for 110-volt d-c. operation, the 110-volt feed circuit being extended to the Type-F controllers mounted on a concrete base near each switch machine. The switches are fitted with heavy tie plates and Morden adjustable rail braces on four ties.

The signals are the Chicago Railway Signal & Supply Company's (now Railroad Supply Company) color-light type, and are equipped with chromatic lenses with adjustable lamp sockets which permit the use of ordinary commercial automobile-type lamps. The relays and switch circuit controllers, relay housings and rectifiers were also furnished by the Chicago Railway Signal & Supply Company (now Railroad Supply Company). The 110-volt, 120-a.h. main operating storage battery is of the Edison type.

This plant was installed by the Chicago Terminal Division signal construction forces under the direction of J. P. Zahnen, signal supervisor, according to plans prepared in the signal engineer's office.

Changes in Car-Hire Rules Are Required

WASHINGTON, D. C.

THE Interstate Commerce Commission has issued a comprehensive report, by Commissioner McManamy, as the result of its investigation of the rules for car-hire settlement, undertaken by the commission on its own motion following a request for such an investigation made by the American Short Line Railroad Association. The commission's findings require a number of changes in the per diem and car-hire rules of the American Railway Association, intended mainly to bring about more liberal treatment of the non-subscriber short lines, including provision for switching reclaim allowances. Although no order is entered at this time carriers will be expected to modify their rules and practices to conform to the conclusions expressed. A proposed report on the investigation was prepared by Director W. P. Bartel and Special Examiner C. A. Rice of the commission's Bureau of Service. The conclusions reached by the commission differ in minor respects from those recommended, which were published in the *Railway Age* of April 20, 1929. The text of the findings follows:

1. Common-carrier railroads, whether subscribers to the per diem agreement of the American Railway Association or non-subscribers, are entitled to receive reasonable compensation in the form of a daily rental for the use of their general-service freight cars when on foreign lines, and that the present per diem charge of $1 per car day reasonably compensates car owners for average car ownership and maintenance costs. The reasonableness of this per diem rate is not questioned.

2. The per diem rules are unreasonable to the extent that they do not authorize payment of the same daily rental of $1 per car day to common-carrier nonsubscribers as to subscribers for the use of general-service freight cars.

3. Per diem rule 5 is unreasonable to extent that it prohibits car-hire allowances to nonsubscribers which perform terminal switching, as the latter term is defined by the switching-reclaim rules of the American Railway Association, and should be so amended as to provide for similar reclaim allowances to nonsubscribers as to subscriber lines.

4. Paragraph (b) of per diem rule 6, which pertains to car-hire settlements with nonsubscribers, is unreasonable and should be so amended as to direct subscribers to make settlements with nonsubscribers in conformity with our findings herein.

5. It is uneconomical and unreasonable to require short-line carriers which return railroad-owned equipment to the road from which received to report per diem accruals to numerous car owners throughout the country. Such lines should be attached to their connecting carriers for purpose of car-hire settlement.

6. For the future it will be reasonable for common-carrier railroads which interchange freight cars with more than one subscriber railroad, and which deliver to one or more subscribing carriers, cars which are received from another such carrier, to make car-hire settlements direct witht car owners in accordance with the per diem rules, and for railroads 100 miles or more in length, regardless of the number of railroads with which they connect, to so report per diem to car owners.

7. For the future it will be reasonable for common-carrier railroads outside switching districts, other than those referred to in finding 6 to pay per diem to connecting carriers on railroad-owned cars after deducting an average of two days'

free time per loaded freight car interchanged, settlements to be made at the end of each calendar month except that no car hire should be paid for cars received for return coal loading from coal mines.

8. The modified demurrage bases of settlement now in force with the Chicago Short Line, Illinois Northern, Manufacturers' Junction, Pullman, Bay Terminal, Benwood & Wheeling Connecting, Birmingham Southern, Genesee & Wyoming, Lake Erie & Fort Wayne, Lakeside & Marblehead, Lime Rock, McKeesport Connecting, Moshassuck Valley, Northampton & Bath, Tionesta Valley, Valley Railroad, and Valley & Siletz are unreasonable and should be abrogated, and that for the future it will be reasonable for connecting carriers to make car-hire settlements with these railroads in conformity with the general findings herein; provided, however, that the modified demurrage bases of settlement now in operation on such of these lines as perform switching service should be continued in force for a reasonable time, but not to exceed six months from the date hereof, to enable interested carriers to determine the amount of time actually required by each of such railroads to handle freight cars in terminal-switching service.

9. The existing basis of car-hire settlement with the Big Sandy & Kentucky River, Greenville & Northern, Jefferson & Northwestern, Kosciusko & Southeastern, Morehead & North Fork, Skaneateles, South Manchester, and Virginia Blue Ridge, is unreasonable, and that for the future it will be reasonable for connecting carriers to make car-hire settlements with these railroads in conformity with the general findings herein. Inasmuch as the bases of settlement here proposed are for general application by all common carriers by railroad throughout the country, no retroactive adjustments will be required.

No order will be entered at this time, but carriers will be expected to modify their rules and practices to conform with our conclusions herein. If this is not done within a reasonable period, the matter may be brought to our attention for appropriate action.

A report of reclaims allowed to short-line railroads pursuant to findings herein and any changes subsequently made therein should be filed with us as soon as determined upon.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended January 25 amounted to 862,261 cars, a reduction of 63,853 cars as compared with the corresponding week of last year and of 40,043 cars as compared with 1928. The decrease is said to be accounted for in part by severe weather conditions. Loading of livestock and coal showed increases as compared with last year, but there was a reduction of 14,221 in forest products and of 37,396 in miscellaneous freight. The Pocahontas and Northwestern district reported increases as compared with last year and the Allegheny, Eastern and Pocahontas districts reported increases as compared with 1928. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

Revenue Freight Car Loading

Week Ended Saturday, January 25, 1930

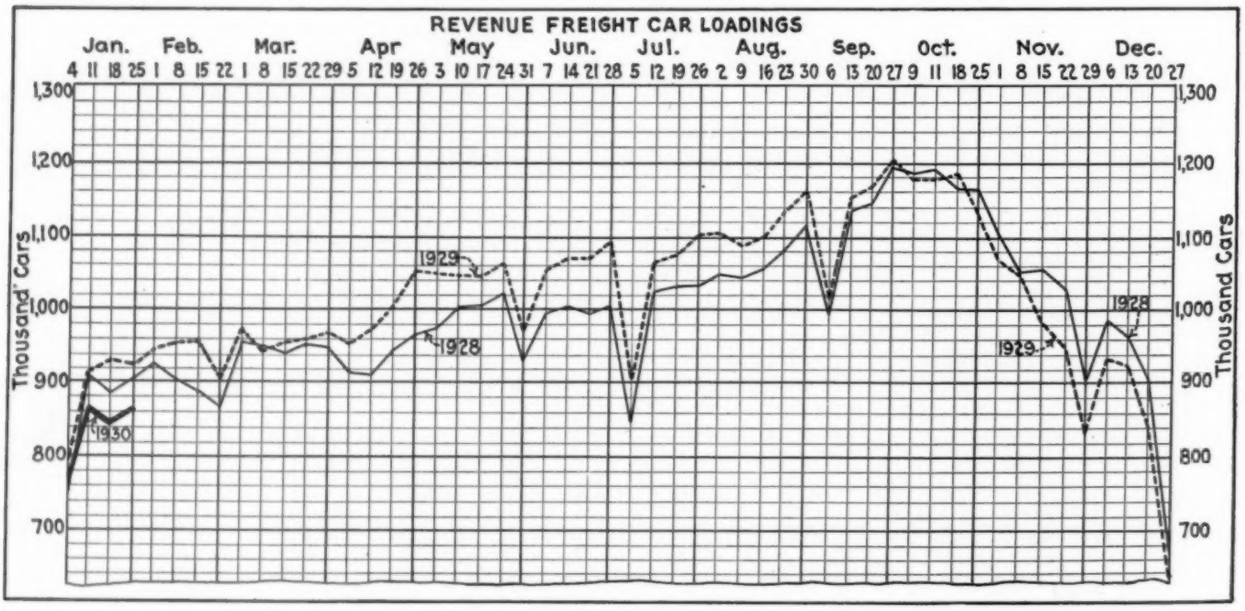
Districts	1930	1929	1928
Eastern	201,659	216,418	200,690
Allegheny	177,280	188,708	177,145
Pocahontas	59,822	58,957	51,711
Southern	132,777	144,783	145,944
Northwestern	103,207	102,070	114,612
Central Western	126,549	139,550	138,117
Southwestern	61,327	75,988	74,445
Total Western Districts	291,083	317,608	327,174
Total All Roads	862,621	926,474	902,664
Commodities			
Grain and Grain Products	38,619	47,960	53,310
Live Stock	29,075	26,840	32,726
Coal	214,249	209,452	176,154
Coke	11,835	12,842	10,989
Forest Products	45,099	59,320	66,081
Ore	7,638	8,566	7,846
Merchandise L.C.L.	232,959	240,951	244,635
Miscellaneous	283,147	320,543	310,923
January 25	862,621	926,474	902,664
January 18	847,353	931,861	884,683
January 11	863,191	914,438	907,301
January 4	776,259	798,682	754,247
December 28	.....	638,445	667,974
Cumulative total, 4 weeks	3,349,424	3,571,455	3,448,895

The freight cars surplus for the period ended January 23 averaged 438,195 cars, including 234,303 box cars, 151,148 coal cars, 24,500 stock cars and 14,582 refrigerator cars.

Car Loading in Canada

Revenue loading at stations in Canada for the week ended January 25 totaled 58,306 cars, an increase of 2,487 cars over the previous week and a decrease of 1,118 cars from the same week last year.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada		
January 25, 1930	58,306	36,681
January 18, 1930	55,819	35,416
January 11, 1930	51,749	32,639
January 26, 1929	59,424	41,219
Cumulative Totals for Canada		
January 25, 1930	210,184	135,983
January 26, 1929	220,823	147,002
January 28, 1928	243,235	139,509



One of the Aluminum Tank Cars Used for Transporting Acetic Acid

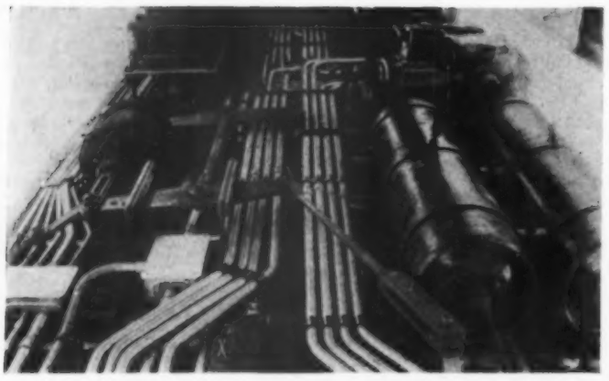
Railroad Use of Aluminum Alloys

Western Railway Club discussion indicates economic advantages of this material and practicability from shop-fabrication standpoint

AT a well-attended meeting of the Western Railway Club at the Hotel Sherman, Chicago, January 20, the use of aluminum alloys in the transportation industry was discussed and much pertinent information developed regarding the method of manufacture, economic advantages and workability of this relatively new material. Dr. P. V. Faragher, metallurgist of the Aluminum Company of America, described the manufacture of aluminum from clay-like Bauxite ore mined in Arkansas, Georgia and Dutch Guiana, and cryolite, a milky white mineral somewhat like glass in texture, mined in Greenland. The general process includes purification of the Bauxite ore by an alkali-reduction process to produce white aluminum-oxide which is subsequently dissolved in molten cryolite and aluminum deposited on the bottom of carbon-lined tanks by the electrolytic process. Doctor Faragher emphasized the large amount of electric power required for this operation; also, in the case of alloys, the careful heat-treatment necessary to obtain the desired physical properties, which further adds to the production costs. Following this address, A. H. Woollen, representing the engineering sales department of the Aluminum Company, presented the paper of the evening on railroad use of aluminum alloys, an abstract of which is included in this report of the meeting.

At the conclusion of the paper, an open discussion was invited and H. A. Brennaman, assistant works manager of the Pennsylvania at Altoona, Pa., commented briefly on the fabrication of aluminum alloy parts used in constructing eight suburban cars at the Altoona shops. Mr. Brennaman said that anticipated difficulties with the fabrication of these parts did not develop and that, with the proper pyrometer-controlled furnace equipment and reasonable care, no more difficulty was experienced in handling aluminum alloy parts than mild steel parts. He said that existing die equipment could be used equally well for both materials and that tests of aluminum alloy parts, pressed either hot or cold, showed no defects. Mr. Brennaman's remarks were corroborated by J. P. L. Sheets, general car foreman at the Wilmington, Del., shops of the Pennsylvania.

T. H. Pindell, general manager of the Alton & Southern, described the performance of aluminum alloy connecting rods and valve-motion parts on a switching locomotive which has been in service since 1926, giving entirely satisfactory performance with noticeably reduced maintenance cost. He also said that maintenance-of-way expense was reduced owing to the small amount of rail hammer with light rods and counterweights. J. W. Coulter, master mechanic of the Alton & Southern, estimated the weight reduction as a result of installing the aluminum alloy rods at a net saving of 42 per cent of the weight of equivalent steel parts and a saving in rod maintenance in the ratio of 3 to 5, as compared with equivalent steel rods. He explained this as being due to reduced weight of reciprocating parts, less unbalanced weight in the driving-wheel counterbalances,



Aluminum Conduit, Junction Boxes, etc., Installed Underneath an Illinois Central Multiple-Unit Car

and consequently a smoother operating locomotive with less rod-bushing and main-bearing wear. In response to a question, Mr. Coulter said that no loosening of bushings in the aluminum alloy rods was noticeable more than in steel rods.

Performance of Aluminum in Illinois Central Multiple-Unit Cars

W. T. Kelly, representing the engineering department of the Illinois Central, outlined the performance of 260 multiple-unit cars, constructed with aluminum roof sheets, interior trim, conduit, etc. He said that no trouble has been experienced with these cars and that the use of the aluminum roof sheets of the same gage as steel sheets was particularly helpful in overcoming corrosion difficulties, formerly encountered with steel sheets, which required renewal sometimes as often as once in four years. In response to a question, Mr. Kelly said that in his experience the greater expansion of aluminum alloys as compared with steel, when the two materials are riveted together, is taken care of by a slight buckling of the aluminum. In no case, however, has this expansion been sufficient to shear rivets or give other serious difficulty.

Upon an invitation from the chairman, G. Van Dyke, manager of the special steel department of Joseph T. Ryerson & Son, Inc., said that an entirely new era of metal construction and application has been developed during the last few years, as indicated by the fact that a metal costing in the neighborhood of 40 cents a pound is being suggested as a substitute for other material which can be purchased for approximately 5 cents a pound. He said that corrosion-resisting alloys, heat-resisting alloys, alloys with high physical properties, acid-resisting alloys and many other metals have been developed, and it is gratifying to note that the makers of all these materials are approaching their sales problems from the standpoint of real service and economy to their customers. Mr. Van Dyke mentioned the use of Allegheny metal in dining-car kitchens where its non-rusting and tarnish-resisting qualities, and low upkeep cost, make its application particularly advantageous. In connection with heat-treatment, he said that the treatment of aluminum alloys within temperature limits of 930 and 960 deg. F., is an indication that the use of modern metals is bringing with it an accuracy and exactness of handling which has taken the place of former guesswork methods. On behalf of the makers of all new metals, Mr. Van Dyke appealed to the railroad men, when forming a opinion regarding the workability of any material, to determine first whether they have developed the right technique for handling, and, if not, whether it may be entirely feasible to install the necessary methods and equipment, thus enabling the railroads to use the material to their profit.

How Aluminum Alloys Serve Railroads

By A. H. Woollen

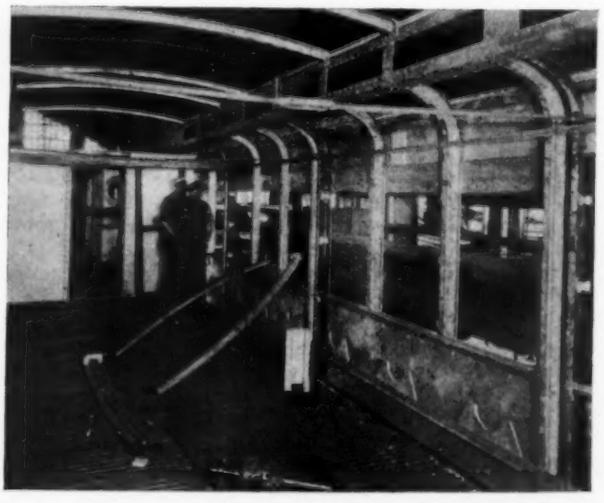
Engineer, Sales Department, Aluminum Company of America, New Kensington, Pa.

The first attempt to reduce the weight of railway equipment by means of the application of the strong alloys of aluminum was in Illinois Central suburban service, the first cars being constructed in 1923. The operation of these cars being satisfactory, 215 additional cars were constructed in 1925, consisting of motor cars and trailers with aluminum used for roof sheets, interior finish, doors, conduit, junction boxes, headlights and other small applications. The reduction in weight averaged 9,000 lb. per car.

About this time the Pennsylvania went even further and constructed eight suburban cars for the electric suburban service outside of Philadelphia with all-aluminum superstructures; that is, posts, carlines, outside and inside sheets, bulkheads, doors, and, in fact, everything above the underframe, with the exception of a belt rail which could not be manufactured in aluminum at the time.

There followed shortly thereafter the construction of 120 Chicago & North Western suburban cars having all aluminum sheets above the underframe. Both the Illinois Central and the Chicago & North Western have since put in service additional cars and have extended the use of aluminum somewhat over the original applications. One of the larger roads, after a thorough study of the cars in service, is now planning an even greater application than has yet been attempted, in which aluminum underframes and truck frames will be used. Many other roads have adopted aluminum for sheets and shapes in gas-electric car design on account of the desirability of weight reduction due to power-plant limitations.

At the present time, aluminum alloys cost from 28 cents to 45 cents a lb., or, on a square ft. basis, 9 to 15 cents, as compared with 3 to 6 cents for steel.



Fitting Hot-Pressed Aluminum Shapes to a Pennsylvania Coach

Therefore, it is necessary to justify this increased cost which amounts to from $800 in a small city-type car to $4,000 or $5,000 in a large railroad car. It has been our experience that this extra cost can be reduced to a unit figure of 20 cents additional cost for each pound of weight saved.

Capital Investment Returned in Four Years

The most direct way to take advantage of weight reduction has been saving of propulsion energy. The cost of hauling around dead weight has been computed by various operating authorities and varies between 5 and 10 cents per pound per year on street railways and 3.5 cents on heavy electric traction lines. Assuming that 20 cents is the extra cost and 5 cents the saving, in four years the aluminum has paid for itself and after that time it is helping to increase the net earnings of the company.

The use of aluminum can be justified by the light weight of the cars which can be used to promote higher schedule speed so that fewer cars may be used for a given service.

The aluminum car is the ideal safety car; its light but strong framework has shown a remarkable ability to absorb impact loads without distortion and when the impact does exceed the yield point of the metal, there is a marked tendency for the structure to hang together. Gusset plates, webs of channels, I-beams and built-up girders will bend but do not tear as do most grades of structural steel. The low modulus of elasticity is probably responsible for these phenomena but the net result is a safer vehicle.

When designing an aluminum car, the same basic principles apply as with any other construction material. Physical properties of the various alloys are well known and are about the same as mild structural steel, except that the modulus of elasticity is used as 10,000,000 in place of 30,000,000 and the coefficient of expansion is about twice that of steel.

Construction of Aluminum Cars

The construction of aluminum cars in car builders' plants does not offer any difficulties that cannot be overcome in a modern shop. Punching, shearing, machining, riveting are all performed with the usual tools available for steel. Bending cold must be watched and the particular qualities of the various grades and tempers of aluminum alloys known, but as soon as the shopmen accumulate experience, this problem offers no objection. Hot bending or forming is the only special feature of aluminum alloys to require particular attention by shop forces, as the technique varies considerably from that of steel. Temperature control is essential, and heating facilities must be provided, differing from those in common use for steel. The strong alloys of aluminum will begin to anneal at 450 to 500 deg. F., and if heated beyond that point must be reheat-treated to regain their original strength. Heat-treatment requires a furnace which can be held at from 930 to 960 deg. F., from which the material is quenched to room temperature. However, the necessary information is available to every shop, both from printed matter and by personal instruction, so that in a short time the shopmen can manipulate the aluminum alloys in an efficient and economical manner.

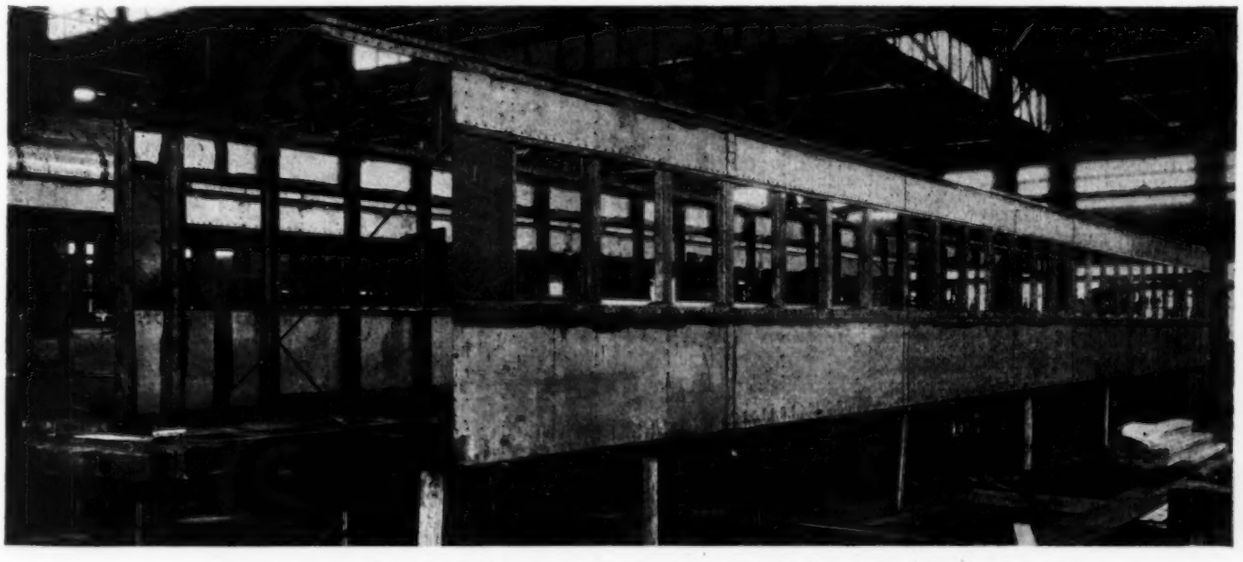
The welding of aluminum can be accomplished by the usual oxy-acetylene torch, and development work is in progress with electric-welding apparatus which promises some excellent results.

Maintenance Factors

The maintenance of the aluminum car should not be any higher than that of the car constructed of materials now standard, and there is considerable indication that we may expect a lower maintenance cost for there will be no tendency for the paint to peel off due to corrosion such as is common in a steel car. If the original paint job is properly done, it would appear that a periodical freshening of the varnish coat should keep the car in good shape and practically avoid a complete burn-off, thus saving $75 to $100 per car per year from this source alone. The replacement of aluminum parts damaged in accidents will cost more than steel, but the damaged parts can be sold for scrap at from 40 to 60 per cent of their first cost.

Cars built of aluminum show no corrosion after two to five years of severe service which leads to the assumption that, as far as corrosion is concerned, the aluminum car will last practically indefinitely.

The shop equipment necessary for the proper main-



Application of Aluminum Exterior Sheathing to a C. & N. W. Suburban Coach

tenance of aluminum cars will not differ from that now used, with possibly two exceptions—a heating furnace and a portable pyrometer. An electric furnace costing $4,000 or $5,000 is preferred, but this would not be necessary until a large amount of regular repair work became necessary, as the ordinary blacksmith forge could take care of most of the jobs of straightening or bending structural shapes required for repair work. It would be necessary, however, to purchase, at an early date, a portable indicating pyrometer which would cost approximately $50. This instrument would permit the handling of aluminum with greater ease in ordinary equipment and prevent damage by overheating.

Aluminum Tank Cars, Locomotive Rods, Etc.

There are numerous other railroad applications of aluminum alloys. Probably the most important of these at the present time is the aluminum tank car. Between 75 and 100 of these cars will be in service on American railroads within the next six months transporting glacial acetic acid, formaldehyde, turpentine and other commodities which may be transported in aluminum cars without damage to car or commodity and thus save the additional cost of lining a steel car. In every instance the aluminum tank car is justified on the basis of first cost, and the savings which it makes for its user are available from the start.

Another use for aluminum has been developed and is still in the experimental stage. I refer to the aluminum connecting rods for steam and electric locomotives and aluminum valve gear parts for steam locomotives. We have had aluminum main and side rods on the Alton & Southern switching locomotives for several years and the reduction in weight of these reciprocating parts effects material savings in maintenance of both locomotives and permanent way structures. With such an important part of the locomotive as the connecting rods we want to be sure that a design is developed which will take advantage of the physical properties of the strong aluminum alloys in such a way as to provide equal, if not greater, safety with the aluminum rods as with the present type of construction. We have demonstrated, to our own satisfaction at least, that the rods in switching locomotives are satisfactory, safe and economical, but before going on to the main line, we felt it essential to conduct laboratory tests on the largest type of freight locomotives which would travel at sufficient speed to introduce substantial factors of centrifugal force. We are now making a set of rods for a heavy Mikado type locomotive and intend to study its performance in a large railroad testing plant. This locomotive will be operated under normal and maximum service conditions and, by means of recording instruments applied directly on the rods, we will have an exact knowledge of the conditions existing in the vital parts of the rods. The locomotive will then be taken out on the road and a service test made. It is hoped that by the June convention of the American Railway Association, Mechanical Division, our tests will be completed and we will be in a position to say to you gentlemen that aluminum side rods, main rods and valve motion parts may be safely and economically applied to any standard steam locomotive.

Aluminum Furniture Past Experimental Stage

One of the most useful applications of aluminum products on the railroads has been the furniture, developed originally for the Pennsylvania. Aluminum dining-car chairs have found wide use and are manufactured in the Buffalo, N. Y., plant to suit the requirements of the railroads. Alcraft aluminum furniture, as it is called, is available in almost any finish and upholstery to meet the desires of the railroads and car builders and shows immediate returns in low maintenance cost.

The motor transport industry is growing by leaps and bounds. Highway construction is becoming such that high-speed vehicles are permissible and are being increasingly used by the railroads. In order to operate high-speed vehicles safely, a high rate of acceleration and retardation is necessary. The use of aluminum construction permits an increase of pay load for a given wheel limit, increased acceleration with a given power plant, greater braking effectiveness and the permanent protection offered by the all-aluminum fire-proof, corrosion-proof, body construction.

The development of the motor coach has been so rapid that builders have figured on a four-year life as all that is necessary to build into a coach body because obsolescence would retire the body before it wore out, but the railroads have found it necessary to build railroad cars for a life of 20 years or more.

Additional miscellaneous uses of aluminum and its alloys in the transportation field are: Transmission lines of aluminum cable, steel reinforced; Albron powder as a base for aluminum paint for signals, bridges, shops, roundhouses, etc.; architectural material, including corrugated sheet, factory sash, casements, etc. Enginehouse smoke jacks have shown that the corrosion from the stack gases will not proceed as rapidly when made of aluminum as of other materials. Aluminum conduit is finding increased use for protecting wiring on locomotives, cars, in shops and enginehouses, and for similar reasons.

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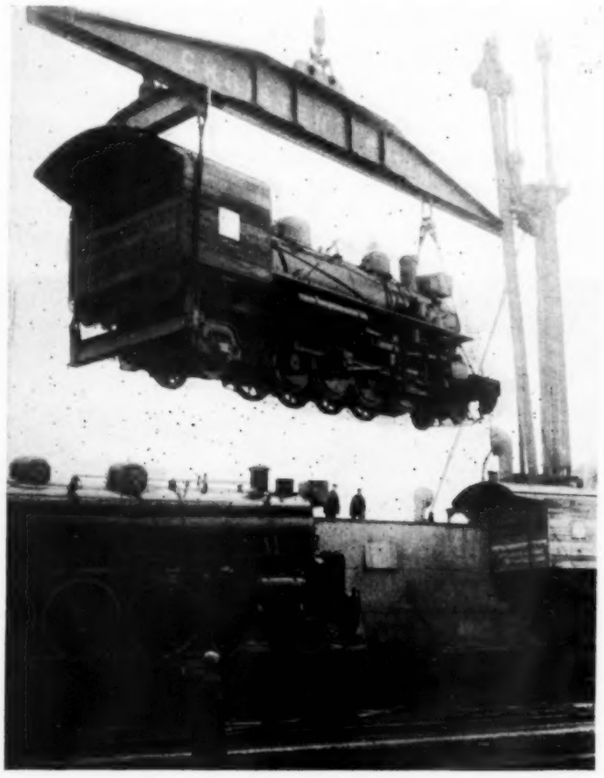


Wide World

Part of a Shipment of Sixteen Baldwin Locomotives and Thirty Coaches, Consigned to the Chilean State Railways, Being Loaded on the Steamer "Belpareil" at Eddystone, Pa.

Missouri Pacific Has Good Year

Company and its controlled lines continue improvement program and heavy maintenance activity

THE Missouri Pacific Lines had a prosperous year in 1929. Net income for the parent company, reflecting its own operating efficiency as well as the returns on the securities of subsidiary companies which it owns, totaled, according to a preliminary statement, $12,217,000, which is equal, after allowing for $5 dividends on the cumulative preferred stock, to $10.41 a share on common, which compares with earnings of $7.15 per share of common in 1928. The company now has pending before the Interstate Commerce Commission an application for authority to issue $38,659,900 of common stock against its uncapitalized surplus to be paid to preferred stockholders to cancel the accumulated dividends—$48.25 per share—on this issue. The solution to the problem of this dividend accumulation will remove the only obstacle which tends to prevent Missouri Pacific's appearing what it actually is—a well-operated and economical substantial railway property.

Table I shows selected freight operating statistics of the Missouri Pacific proper—the first ten months of 1929 compared with the same period of 1928. It will be seen that in almost all possible phases, improved operating efficiency was shown. An increase of 9.5 per cent in gross ton-miles was accompanied by an increase of but 7.8 per cent in train-miles and train-hours. Locomotive utilization increased and the percentage of unserviceable cars and locomotives was materially reduced.

Detailed figures of revenues and expenses for the first eleven months of 1929 as compared with the same period in 1928 for the Missouri Pacific and its controlled companies are given in Table II. Therein it is shown that the Missouri Pacific proper showed an increase in freight revenues of 7.7 per cent and an increase in gross revenues of 7.4 per cent. Maintenance of way activity was heavy, such expenditures showing an increase of 15.8 per cent, reflecting the company's policy of bringing its plant up to a high standard of physical well-being. Maintenance of equipment expenses, however, decreased 6 per cent, which is a remarkable showing in that the percentage of unserviceable cars and locomotives to total was lowered. Total operating expenses increased only 4.5 per cent, making a very favorable comparison with the 7.4 per cent increase in revenues. The maintenance of way ratio to operating revenues for the first 11 months of 1929 was 17.6 per cent; the maintenance of equipment ratio, 16.2; the transportation ratio, 33.2; and the operating ratio, 73.2. These last two ratios, i.e., transportation and operating, showed decreases of 3.2 per cent and 2.7 per cent, respectively, when compared with the similar period of 1928.

Traffic on the Texas & Pacific was lower than in 1928 and operating revenues for the eleven months showed a decrease of 8.7 per cent. Transportation expenses, however, were reduced by 10.9 per cent and total operating expenses, 6.9 per cent. The maintenance of way ratio to operating revenues for the first eleven months of the year was 16 per cent; the maintenance of equipment ratio, 16.9; the transportation ratio, 30.7; and the operating ratio, 69.1.

Table I—Missouri Pacific Railroad—Comparison of Selected Freight Operating Statistics—Ten Months

	1929	1928	Per cent of change Inc.	Dec.
Mileage operated	7,432	7,414	0.2	
Gross ton-miles (thousands)	26,110,442	23,841,196	9.5	
Net ton-miles (thousands)	10,847,146	9,982,311	8.7	
Freight train-miles (thousands)	14,786	13,720	7.8	
Freight locomotive-miles (thousands)	15,861	14,622	8.5	
Freight car-miles (thousands)	677,762	623,439	8.7	
Freight train-hours	1,070,695	997,036	7.4	
Car-miles per day	42.1	40.8	3.2	
Net tons per loaded car	24.9	24.7	0.8	
Per cent loaded to total car-miles	64.4	64.8		0.6
Net ton-miles per car-day	674	654	3.1	
Freight cars per train	46.8	46.4	0.9	
Gross tons per train	1766	1738	1.6	
Net tons per train	734	728	0.8	
Train speed, miles per train-hour	13.8	13.8	...	...
Gross ton-miles per train-hour	24,386	23,912	2.0	
Net ton-miles per train-hour	10,131	10,012	1.2	
Lb. coal per 1,000 gross ton-miles	125	123	1.6	
Loco.-miles per loco.-day	83.5	76.4	9.3	
Per cent freight locos. uncerviceable	12.9	13.9		7.2
Per cent freight cars unserviceable	4.7	5.7		17.5

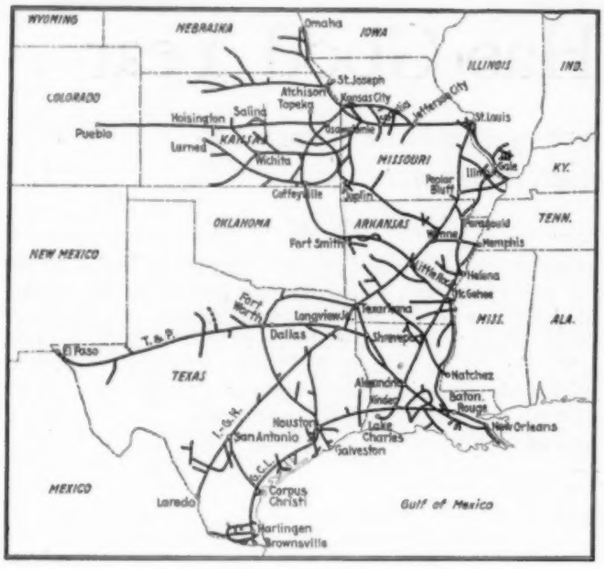
The International-Great Northern likewise suffered a decline in traffic, its operating revenues for the first eleven months of 1929 being 2.4 per cent lower than for the same period in 1928. Its operating expenses were reduced 1.9 per cent. The operating ratio was 78, as compared with 77.6 in the same period in 1928.

The Gulf Coast Lines showed an increase of 3 per cent in operating revenues and an accompanying increase of only 0.3 per cent in operating expenses. Net railway operating income, therefore, showed the very favorable increase of 6.5 per cent. The operating ratio of the company was reduced from 71.7 in the first eleven months of 1928 to 69.9 in the same period last year.

As indicated in the foregoing, the Missouri Pacific, in

Table II—Missouri Pacific and Controlled Companies—Revenues and Expenses

	Missouri Pacific		Texas & Pacific		Gulf Coast Lines		International-Great Northern	
	Eleven Months 1929	Comparison with 1928 (11 months) +Inc. or —Dec. %	Eleven Months 1929	Comparison with 1928 (11 months) +Inc. or —Dec. %	Eleven Months 1929	Comparison with 1928 (11 months) +Inc. or —Dec. %	Eleven Months 1929	Comparison with 1928 (11 months) +Inc. or —Dec. %
Frt. Rev.	$106,227,841	+ 7.7	$34,177,650	—10.3	$11,667,593	+ 3.0	$13,157,210	— 4.6
Psngr. Rev.	11,961,971	— 3.7	4,943,070	— 8.2	1,395,178	— 6.8	1,872,201	— 6.6
Total Op. Rev.	129,695,178	+ 7.4	42,205,549	— 8.7	13,981,459	+ 3.0	16,859,116	— 2.4
M. of W. Exp.	22,778,331	+15.8	6,747,846	—10.	2,265,205	— 1.6	2,637,581	— .6
M. of E. Exp.	21,040,546	— 6.0	7,153,352	— .02	2,398,382	+ 0.9	2,759,658	— 3.0
Transp. Exp.	43,000,136	+ 3.7	12,960,116	—10.9	3,971,858	— 0.4	6,518,492	— 4.1
Total Op. Exp.	94,877,976	+ 4.5	29,174,305	— 6.9	9,766,959	+ 0.3	13,144,843	— 1.9
Net Ry. Op. Inc.	23,177,878	+17.1	8,322,399	—13.0	2,862,928	+ 6.5	2,126,911	—14.9
M. of W. Ratio %	17.6	+ 8.0	16.0	— 1.2	16.2	— 4.7	15.6	+ 1.3
M. of E. Ratio %	16.2	—12.4	16.9	+ 9.0	17.2	— 1.6	16.4	— 0.6
Transp. Ratio %	33.2	— 3.2	30.7	— 2.5	28.4	— 3.4	38.7	— 1.5
Oper. Ratio	73.2	— 2.7	69.1	+ 1.9	69.9	— 2.5	78.0	+ 0.5



The Missouri Pacific Lines

the accumulated dividend on its preferred stock, has a financial problem of some importance to face, but the situation is by no means serious and apparently will soon be solved so that the company may then consider the payment of dividends on its common stock.

Meantime each month sees further progress on bringing the property up to a higher physical standard and in the introduction of improved operating devices and methods, designed to improve service, strengthen the road from a traffic standpoint, and promote operating efficiency, thereby increasing earnings. Among such projects under way at the end of 1929 were the following: Construction of a new line from Illmo, Mo., to Cape Girardeau; reduction of grades at four points on its line in Illinois; reduction of grades, realinement and second tracking on the St. Louis-Kansas City line; revision of alinement and reduction of grades between Osawatomie, Kan., and Council Grove and between Gypsum City and Hoisington; extensive bridge improvements and raising of grades to obviate flood difficulties; and new team tracks, freight stations and other traffic facilities at many points.

In 1929 an additional 240 miles of line were equipped with automatic signals, including an installation of centralized dispatcher control. The Missouri Pacific, incidentally, in recent years has been a leader in the adoption of modern signaling improvements for the solution of the problem of congestion and consequent delays to trains on difficult sections of its lines. Continuing this policy, further extensive signaling installations have been planned for 1930.

The Texas & Pacific also has widely extended its signaling installations—such protection being extended to an additional 207 miles of line during 1929. This company continued its program of capital improvements during the year. Its new Atchafalaya river bridge at Melville, La., was completed, as was its grade revision project at Ft. Worth, Tex., and the new terminal facilities at Relay terminal, Macks, Tex. Terminal improvements at Bonham, Tex., and Big Spring, and second tracking from Dallas, Tex., to Nussbaumer, 11.5 miles, were begun.

The Missouri Pacific in 1929 ordered five 4-8-2 type locomotives and twenty-five 2-8-4's and 7,615 freight cars. The Texas & Pacific ordered fifteen 1-10-4's and 1,500 freight cars. The Missouri Pacific also ordered 44 passenger train cars in 1929 and has placed further orders for this class of equipment since the first of 1930.

A major development in the Missouri Pacific's policy of improved service to its territory, combined with greater efficiency of operation, has been its aggressive policy on motor transport. Its decision to enter this field was followed by a rapid expansion until the Missouri Pacific's highway subsidiary is now one of the outstanding railway-owned highway operations in the country. A gage of the rate of expansion of this service is given in its orders for motor coaches which in 1929 totaled 63.

An indication of the character of improvement in service which the Missouri Pacific is offering to its patrons is nowhere better given than in its improved passenger train schedules. An outstanding example of this is the Scenic Limited which formerly made the 905-mile run from St. Louis to Pueblo in 27½ hours, or at 32.9 miles per hour. The same run is now made in 22 hours 3 minutes, or 41.1 miles per hour—an increase in average speed of 25 per cent.

The Interstate Commerce Commission's consolidation plan apparently opposes no obstacles to the Missouri Pacific's policies. All its subsidiary companies were assigned to it and, in addition, the Missouri Pacific was favored as the eastern connection for the Western Pacific and Denver & Rio Grande by having those lines assigned to it in the plan. An application of the Missouri Pacific to lease all its controlled lines except the Texas & Pacific is now before the commission. The proportion of its stock ownership to total in the latter company, while sufficient to secure control, is not as great as that in its other subsidiaries. Control of the Denver & Rio Grande Western is shared equally with the Western Pacific.

The maintenance of the western traffic route through Pueblo is of considerable importance to the Missouri Pacific, since this connection has in recent years aided materially in the great increase in traffic enjoyed by its Colorado line. Incidentally, this line upon which traffic has grown so greatly has not been particularly easy of operation and two of the major grade revision projects now under way on the system are on this one line. The completion of this work should serve to make the traffic on this line considerably more remunerative.

In 1928 the Missouri Pacific's gross income—$25,385,138—exceeded the funded debt and other charges deductible from gross income by 60 per cent. The increase in earnings in 1929 will, of course, bring an even more favorable showing in this factor of safety for the year just past.

Table III—Missouri Pacific Railroad—Revenues and Expenses

	Oper. Rev. Freight	Oper. Rev. Passenger	Total Oper. Revenues	Operating Expenses	Net Ry. Oper. Income	Gross Income	Net Income	Investment in Road & Equipment Increase
1921	$81,688,215	$19,241,029	$109,785,949	$91,693,855	$10,236,848	$15,270,486	$3,537,016	$8,885,159
1922	73,918,551	16,898,650	99,921,331	84,658,914	8,247,034	10,710,817	1,413,712*	6,712,521
1923	85,961,414	18,970,393	114,607,947	97,939,965	8,893,245	16,332,478	121,345	12,782,103
1924	95,949,391	17,525,199	123,647,723	98,466,365	15,817,584	19,384,445	6,503,217	18,731,055
1925	104,319,276	16,536,035	130,831,661	102,276,499	18,013,063	22,472,152	7,648,208	24,253,193
1926	107,913,649	16,035,972	133,990,294	102,85.,943	20,333,785	23,955,071	8,631,667	19,337,885
1927	100,788,411	14,652,502	125,728,405	99,565,997	16,899,498	20,723,265	4,401,196	22,665,911
1928	107,388,214	13,552,823	131,576,525	99,091,201	21,347,536	25,385,138	9,512,690	15,803,618

* Deficit.

A Train of Logs in the Long-Bell Holdings Near Ryderwood, Wash.

Wood Preservers Give Railways Prominent Place on Program

Annual convention considers wider use of treated timber and greater refinements in plant methods

RECOGNITION of the important place occupied by the railways as consumers of treated timber was in evidence throughout the program of the twenty-sixth annual meeting of the American Wood-Preservers Association, which was held at Seattle, Wash., January 28-30. Among those in attendance were many engineering officers, lumber purchasing agents, superintendents of treating plants and inspectors of the railways.

Approximately 100 persons enroute to the convention left Chicago on Thursday morning, January 23, on a special train provided by the Chicago, Burlington & Quincy and the Union Pacific, stopping enroute to visit the treating plants of the Burlington at Galesburg, Ill. and of the Union Pacific at Laramie, Wyo., Pocatello, Idaho and The Dalles, Ore. A further stop was made at Longview, Wash. on January 27 to visit the mills of the Long Bell and the Weyerhauser lumber companies, where opportunity was afforded to witness the handling and sawing of Douglas fir and western hemlock timber.

Important papers were read before the association on such subjects as the Use of Creosoted Douglas Fir on the Pacific lines of the Southern Pacific, by F. D. Mattos, manager treating plants of that road; The Use of Creosoted Douglas Fir Piles and Timber in Dock and Bridge Construction, by R. J. Middleton, assistant chief engineer, Chicago, Milwaukee, St. Paul & Pacific; and three papers on various phases of the termite problem, by Geo. M. Hunt, Forest Products Laboratory, Madison, Wis., and T. E. Snyder of the Bureau of Entomology, Washington, D. C., by Charles A. Kofoid, professor of zoology, University of California and by Merle Randall, professor of chemistry, University of California. Other papers were presented on subjects relating to the handling, seasoning and treating of timber and to service records of treated ties and posts.

In addition to these individual papers, committee reports were presented on the technical work of the association, those of major interest to the railways being on treated timber in car construction, on tie service records and on posts.

In reviewing the work of the association during the last year, President Horrocks took occasion to emphasize the responsibility of the organization for the perfection of standards for handling and treating timber. "It is our responsibility," he said, "to establish accurate workable standards and specifications. Records of performance are required and we must continue to supply them. We must be open-minded to new or improved preservatives and methods of treatment but we cannot endorse such innovations until they have passed the acid test of technical, practical and service proof." Continuing, Mr. Horrocks said, "Our associa-

tion must be as careful in fostering and promoting the proper grade of material to be given preservative treatment as in protecting the user in the correct preservative teatment for the purpose intended."

At the closing session on Thursday morning the following officers were elected for the ensuing year: President, C. C. Cook, maintenance engineer, Baltimore & Ohio, Baltimore, Md.; first vice-president, John Penney, vice-president, T. J. Moss Tie Company, St. Louis, Mo.; second vice-president, Elmer T. Howson, western editor, *Railway Age;* secretary-treasurer, H. R. Dawson, Chicago; members of the executive committee, Robert H. Moore, general manager, American Creosoting Company, Louisville, Ky.; and F. D. Mattos, manager treating plants, Southern Pacific, West Oakland, Cal. Philadelphia was selected as the headquarters city for the next convention.

The Treatment of Car Lumber

While the use of treated material in car construction is increasing slowly, considerable evidence that this subject is not receiving the attention that it deserves was indicated in a report presented by a committee of which D. R. Elmore, assistant general manager, Fruit Growers Express, was chairman, from which the following is abstracted:

In its canvass of the railroads, the committee found that many roads advanced the theory that all wooden parts of flat, stock, and gondola cars except sign boards, side and end planks, and wooden units requiring painting, can be treated with economy. It is obvious, however, that these roads, in spite of their opinion that large quantities of car stock should be treated, have not given the subject serious consideration. Since January 1, 1929, 1,950 stock cars have been reported to have been purchased by three different railroads, and the best information the committee could develop was that no treated lumber was used in 1,450 of these cars. Some railroads consider lumber treated with any of the now known preservatives objectionable, even in stock cars, because such equipment is employed for handling watermelons, sugar beets, potatoes, etc.

Last year's report discussed the problems surrounding a satisfactory and acceptable treating agent for service where creosote is barred, and the development of ways and means for its successful use in car lumber, such as siding, roofing, lining, etc., usually purchased finished to pattern and thoroughly kiln dried. Since zinc chloride is the only other preservative recognized by the association, the committee undertook, as an experiment, to treat with it several thousand feet of siding, roofing, and lining that had been thoroughly kiln dried and run to pattern. The treatment consisted of ¾ lb. retention per cu. ft., and the lumber was redried in a kiln afterwards. The object of the experiment was to ascertain whether such lumber could be returned without damage to its original moisture content, and second, to determine the detailed steps, including costs, length of time, etc., necessary to accomplish this.

The results of the experiment were unsatisfactory. The lumber absorbed 31.4 lb. of treating solution per cu. ft.; upon being rekiln-dried it still contained approximately 18 per cent moisture in comparison with 8 per cent moisture before treatment. After treatment and drying, the lumber varied in width as much as 5/16 in. or 6 per cent and generally contained damaging checks, badly raised grain, washboard surfaces, etc., leaving it unsuitable for the use intended. Since the kiln-drying facilities were not of the latest type, they may have contributed to the failure. The committee reports this experiment, not as a precedent, but to show the difficulties that may be expected in extending the use of treated lumber in certain sections of car construction and maintenance.

The Atchison, Topeka & Santa Fe is continuing observations on cars in which treated lumber has been used, but reported that these have not been in service long enough to afford a comparison between treated and untreated lumber. During 1929, 200 new flat cars were built, in which creosoted lumber was used throughout, that is, the nailing stringers, blocking, decking, etc. This road is opposed to applying lumber treated with any of the now known preservatives, including creosote or any of the salts, in any equipment except open cars, such as flats and gondolas. Stock cars are used for various classes of lading such as watermelons, sugar beets, potatoes, etc., in which equipment it would be safe to use only an odorless and non-poisonous preservative.

The Atlantic Coast Line reports an increased use of treated car material and is now treating all running boards. Liquid spiritine and english creosote are heated in a vat to a temperature of 175 deg. F., into which the lumber is immersed for a period ranging from 3 to 12 hours.

The Baltimore & Ohio uses a brush treatment on the sills and ends of posts in certain types of cars.

The Central of Georgia continued, during 1929, the use of creosoted floors for flat cars, stock cars and coal cars and of sills for stock cars.

The Central of New Jersey reports that several hundred wooden hooper cars which had a brush coating of creosote applied to flooring and sills a number of years ago, are now being dismantled and the treated sills are found to be in a decayed condition.

The Chicago, Burlington & Quincy reports treating flooring and side sills in stock cars and the use experimentally of zinc meta arsenite for lumber, other than poles.

The Chicago, Rock Island & Pacific is of the opinion that modern car construction precludes the use of wood in the underframes and superstructures of box, auto, and stock cars, except for flooring, lining, siding, running boards, purlines and plate fillers; in open top cars, except for side plank; in flat cars, except for flooring, and in tank cars, except for running boards. Replacements of these latter items are brought about by breakage, checking, splitting, wear and other defects not caused by decay, and the hazard of increased claims, involved in the use of creosoted lumber, must be taken into consideration: flat cars offer the best opportunity for economy in the use of treated lumber without affecting other elements, provided it can be established definitely that decay is the principal cause for replacement, rather than other defects.

The Great Northern reports that none of the treated lumber previously applied in stock cars has been taken out for any cause, except damage, whereas in the past a large amount of untreated stock car decking has been removed on account of rot.

The Kansas City Southern recently inaugurated a test of zinc chloride treated lumber when renewing certain parts of cars that had been found most subject to decay.

The Missouri-Kansas-Texas has not extended the use of treated lumber during the last year, but proposes, this year, when overhauling refrigerator cars, to apply treated roofing boards, running boards and running board saddles. The study which it has made of the causes of deterioration of wood members of cars indicates principally mechanical wear in the siding boards of open top cars from the use of loading devices, shifting loads, etc., rather than deterioration of the wood itself; the same condition is found with respect to the lining of box cars, which is mutilated by the fastening of the lading in the car by spikes, nails and cleats. The creosoted black gum decking for open top cars has proved very satisfactory, outlasting considerably the pine used in cars of this type.

The New York, Chicago and St. Louis has secured good results from lumber immersed in hot creosote and applied to 300 stock cars in 1922, and 300 in 1924. The members treated in the first lot were stringers in the main floor, siding, end plate fillers and door posts, upper deck joists, upper and lower floors, purlines, ridge poles, saddles and running boards; and in the second lot, floor stringers, floor joists and flooring only.

The Rutland has been treating car sills and other parts subject to decay for a number of years with good results. The treatment is with creosote in an open tank, and includes material for milk and refrigerator cars; this road has had no complaint of odors or claims for damaged lading.

The St. Louis-San Francisco tried experimentally the use of zinc-chloride treated car roofing several years ago, but the record of results is necessarily incomplete; also in renewing decks on coal and flat cars, approximately 250,000 board ft. of creosoted 3-in. gum was used in 1928, and 500,000 ft. each of creosoted pine and gum decking was used in 1929. It is expected that a larger quantity will be used this year.

The Texas & Pacific built 500 stock cars last year, which were equipped with creosoted flooring and floor stringers.

The Western Union Telegraph Company used 5,000 board ft. of car roofing, 14,000 ft. of car siding and a relatively small quantity of oak sills in sleeping, box, and caboose cars during the past year, all treated with zinc meta-arsenite, both full and empty-cell processes, with a net retention

of ¼ lb. per cu. ft., the strength of the solution averaging 2.5 per cent.

A total of 3,131,845 board ft. of lumber in the form of sills, decking, flooring, roofing and nailing strips was treated for use in cars during the year. Practically all of this was treated with creosote, with a range in absorption of from 6 to 12 lb. per cu. ft. A small amount of decking and flooring was treated with zinc chloride or Wolman salts.

Creosoted Douglas Fir in Dock and Bridge Construction

By R. J. Middleton,

Assistant Chief Engineer, Chicago, Milwaukee, St. Paul & Pacific, Seattle, Wash.

Puget Sound is subject to a maximum tidal range of 19 ft. The waters of the sound are very uniform in salinity and temperature and there is considerable current along the shores of its many harbors. The wide range of tide exposes a large area of pile surface to salt water; this, together with the uniformity of salinity and temperature, and the shore currents, are all very favorable to the propagation, distribution and sustenance of marine borers.

Our inspectors have observed Bankia borings and Limnoria erosions at all of our water front structures; the former working mostly between mud line and mean low tide lever, while the latter makes its attack above low water. We have found it impossible to forecast, even approximately, the life of untreated piling or timber in these waters. In some extreme cases of which we have record, the life has been quite short. In one instance the Bankia destroyed untreated piling in six to eight months, and in another instance, at a different locality, the Limnoria worked equally fast.

Our experience indicates that creosoted timber better resists the attack of the Limnoria than of the Bankia, as the work of the Limnoria has been confined largely to untreated timber, or to treated timber where the creosote shell has been broken either by driftwood chafing, by Bankia borings, or by inadequate field creosoting of bolt holes.

During 1909 the Milwaukee railroad constructed two docks on its water front at Tacoma, Wash., using creosoted Douglas fir piling. In that year approximately 1,100 creosoted supporting piles and 68 untreated bark-stuck fender piles were driven for the first unit of Dock No. 1. Untreated bark-stuck fender piles were used because it was thought that the mechanical wear and breakage caused by steamships berthing along the dock would be so great as to make treated piles uneconomical. However, the mechanical wear was less and the activities of marine borers were greater than was anticipated; hence when fender piles required replacement, creosoted piles were used.

Low tide inspection and pulling tests were made annually and by 1919, or ten years after construction, approximately 50 per cent of the piling were found to be badly infested by the marine borers. At the end of 1922 we had completed the redriving of the original portion of Dock No. 1, constructed in 1909. Notwithstanding the fact that the creosoted piling under the first unit of this dock gave somewhat less life than expected, they did prove a decided economy in comparison with untreated piles.

During 1912, Dock No. 1 was extended to approximately twice its original length and 946 treated piles were driven. The 1928 inspection disclosed 56, or 6 per cent, of the piles infested, but none have as yet been redriven.

Early in 1909, 737 creosoted supporting piles and 71 untreated bark-stuck piles were driven for a warehouse and grain elevator, known as Dock No. 3. As with Dock No. 1, these untreated fender piles gave very short life and were soon redriven with creosoted piling, making a total of 808 creosoted piles in this structure. In 1922 the inspection showed 176 piling infested, of the original 808, that had been redriven by the close of the year. A careful diver inspection made in 1927 showed about 80 piles, or 10 per cent, infested with marine borers, and they were redriven. Ten per cent were estimated to be good for at least five years and the remainder appeared entirely sound.

During 1917 our company constructed another dock in the vicinity of Dock No. 1, and of approximately the same size, known as Dock No. 2. This structure required 2,550 creosoted piles. The specifications followed in the treatment of these piling required 12 lb. of preservative to be used. Piling in this dock are very large and apparently well treated and we have to this date found only one infested pile.

Near the foot of Lander Street, Seattle, our company, in 1908, drove 1,054 creosoted piles for Milwaukee Ocean Dock. In 1927 a diver inspection was made and 1,036 piles were examined with the following results—17.3 per cent bad, 10.9 per cent good but slightly infested, 71.8 per cent sound. In 1927 general repairs were made to the Ocean dock and these badly infested piles were redriven. The dock was extended and 1,330 piles were used. All these piles were creosoted in accordance with our latest specification.

From the foregoing it will be noted that we have in one of our docks few, if any, of the piles driven 20 years ago, while in another fully 70 per cent remain, and in another 78 per cent are still in use. Also the outer end of one has fully 96 per cent in place after 16 years use, and another has 100 per cent after 12 years service.

In the use of creosoted piling and creosoted timber in dock construction there is a matter of fire hazard which gives dock owners no little concern. A few years ago a dock in Seattle, supported on creosoted piles, was destroyed by fire, which apparently originated beneath the dock and because of the rapidity of action, the fire was soon out of control. A similar fire occurred in Seattle in July, 1929. The latter structure was supported on creosoted piles with creosoted caps and stringers. The fire apparently originated underneath the floor at the outer end of the dock and in an amazingly short time it traveled underneath the floor of the entire length and breadth of the building charring the caps, stringers, the underside of the floor, and the piling down to the water line and burning holes through transverse draft curtains, about 100 ft. apart, under the dock. The interior of the structure was preserved by a sprinkler system but it was very difficult to fight the fire where it attacked the unprotected portions outside of the warehouse, because of the intense heat and dense smoke of the burning gases generated.

Treated Douglas Fir On the Southern Pacific

By F. D. Mattos

Manager Treating Plants, Southern Pacific Company, Oakland, Cal.

The Southern Pacific Company's wood preserving activities started when a creosoting plant for the treatment of Douglas fir piling was put in operation at San Pedro, Cal., early in 1889. Piling was the principal

product and a considerable quantity was treated; some timber was also treated. Treatment was by the Bethel process. The piling treated at this plant was used in the construction of the Oakland Broadway ferry slip in 1889, the Oakland Long Wharf in 1890, and the Santa Monica Long Wharf in 1892.

When the Oakland Long Wharf was dismantled in 1919, many of the piles driven in 1890 were still in perfect condition. The Santa Monica Long Wharf was dismantled in 1916, and a large percentage of the piles salvaged from that structure were re-driven elsewhere, many of which are still in service. Early in 1890 the San Pedro plant was partially destroyed by fire. The salvaged equipment was removed to Oakland and set up for creosoting piling and lumber and for the treatment of ties with zinc chloride. From 1917 until 1924, lumber used in inland construction was also treated with a mixture of two-thirds creosote and one-third fuel oil.

In 1893 a portable treating plant was also put in service. This plant, known as the Latham plant, was used at various points from Oakland north, principally for the treatment of ties with zinc chloride. In 1906 another portable plant was put in service at Los Angeles, Cal., also principally for the treating of ties with zinc chloride. In 1922 the Los Angeles plant was moved to Wilmington, Cal., and two 6-ft. by 132-ft. retorts added. Ties were treated with straight creosote at Wilmington until 1924, at which time treatment with a creosote and fuel oil mixture was started. In 1924 the Southern Pacific Company acquired the plant of the El Paso & Southwestern at Alamogordo, New Mexico, through merger. This plant has two 6-ft. by 106-ft. retorts, built in 1902.

In September, 1925, a new plant was put in service at Oakland. The following year the Latham portable plant was dismantled and a new plant was put in service at Eugene, Ore.

The abandonment of the Latham plant marked the end of zinc chloride treatment. Present practice is to treat ties and lumber for inland construction with a mixture of 70 per cent creosote and 30 per cent fuel oil by weight. Lumber for marine structures and all piling are treated with straight creosote.

The principal output of these plants is cross ties. The average number treated annually for the past three years has been 2,750,000 ties. These were all treated by the Rueping process with a final retention ranging from 7 to 7½ lb. of the mixture per cubic foot. About ten million feet, board measure, of lumber and piling are treated annually. The lumber is treated to practical refusal with the same mixture used for ties. All piling is treated with straight creosote, with a retention of 12 to 15 lb. per cubic foot.

At the present time about 85 per cent of the ties used annually are treated. Some untreated cedar and redwood ties are used and a few untreated Douglas fir ties are placed on sharp curves where mechanical wear is so rapid that the ties have no chance to decay before they are destroyed. Of the 34,000,000 ties which were in track at the beginning of 1929, 34 per cent were treated with either straight creosote or mixture, 31 per cent were treated with zinc chloride, and the balance were untreated. At that time only 16 per cent of the switch and bridge ties in track were treated, but those are now being treated before installation.

The various wooden bridges, trestles and marine structures on our lines, which aggregate 140 lineal miles of line, contain approximately 400,000,000 ft. board measure of Douglas fir timber, of which about 40 per cent is treated. This percentage will increase as the replacement of untreated structures becomes necessary. These 140 miles of timber bridges represent 95 per cent of the total of all bridges which we have in service. The other 5 per cent consist of combination steel and timber bridges and bridges of other materials. There are also about 275,000 pieces of piling supporting inland structures, of which approximately 75 per cent are creosoted Douglas fir. In marine structures there are in the neighborhood of 60,000 pieces of Douglas fir piling all treated.

We have many bridges in which creosoted Douglas fir piles and stringers have lasted over 30 years and are still in excellent condition. One such structure, built in 1900, still has all the original stringers and piling, although two additional piles per bent were added in 1923. Another structure has been in a branch line in Southern California since 1896 without requiring any work. Such repairs as have been made on these structures have been minor and have consisted principally of the replacement of caps because of crushing, and the renewal of a few piles that were split in driving. Since the life of untreated Douglas fir stringers ranges from 8 to 15 years, the desirability of using treated material is evident.

Cross ties are no longer removed from Southern Pacific tracks on account of decay. When we were using considerable numbers of untreated Douglas fir ties we found that their average life on the Pacific Lines was 6 years. Treatment with zinc chloride resulted in a life of 11 to 12 years. Our experience with oil treated ties is not yet extensive enough to give us exact figures on their life, but the data now available indicate 21 to 22 years. The deep and uniform penetration of creosote-fuel oil mixtures in incised Douglas fir ties appears to be adequate to prevent decay for much more than this period. Rail cutting, splitting, checking, and in the case of ties on curves, crushing under the lower rail, are the factors which determine the life of the mixture-treated ties. We are continually experimenting with devices to reduce these factors. For a number of years we have been using flat bottom tie plates of our own design in place of the ribbed tie plates used in former years which did so much damage to ties. Continuous joints are being replaced by angle bars. Abrasion plates are being placed under the continuous joints still in track and slot spiking of all joint supports has been discontinued. On curves where the greatest wear occurs, we are experimenting with a gage plate which is fastened to the tie under the tie plate. The ties are bored and adzed for the plate before treatment, and the plate is fastened by a bolt through the tie, located far enough from the rail bearing to avoid weakening the tie.

Tie Service Records

The Committee on Tie Service Records, of which W. R. Goodwin, engineer of wood preservation, Minneapolis, St. Paul & Sault Ste. Marie, was chairman, presented a table showing the tie renewals per mile for 1928, on 26 railways having a total mileage of 208,308. It is of particular interest that again in 1928, 21 roads reported that 90 per cent or more of the ties used for renewals were treated, while 8 of these roads did not use any untreated ties and 2 of these latter have not done so for the last four years. Fourteen roads show that 80 per cent or more of all ties in their tracks are treated; of these roads, 7, or half, report that less than 10 per cent of the ties in use are untreated; while 1 road has no untreated ties in service. It is of further

interest that on 17 roads the renewals were less than 165 ties per mile; the 7 roads upon which 90 per cent or more of the ties in service are treated, used an average of 120 ties per mile in 1928 for renewals; while those roads with less than 80 per cent of treated ties in service averaged 201 ties per mile.

The table showed the following renewals per mile of maintained track during 1928 and also the average annual renewals during the last five years as follows:

Road	1928 Renewals	5-year Average Renewals
A. T. & S. F.	156	125
B. & O.	164	185
C. & O.	222	270
C. B. & Q.	164	154
C. & E. I.	122	107
C. C. C. & St. L.	100	117
C. I. & L.	120	129
C. M. St. P. & P.	284	233
C. R. I & P.	148	140
D. L. & W.	91	93
G. N.	226	207
I. C.	262	180
K. C. S.	147	155
L. V.	56	86
M. C.	108	157
M-K-T	219	228
M. P.	248	287
M. St. P. S. Ste. M.	270	298
N. Y. C. (East)	141	164
N. Y. C. (West)	89	102
N. P.	151	155
Penna.	150	181
Reading	138	172
S. P. (Atlantic System)	221	236
S. P. (Pacific System)	195	220
U. P.	177	199

Preservative Treatment of Engelmann Spruce Ties

By J. D. MacLean

Senior Engineer, Forest Products Laboratory, Madison, Wis.

Engelmann spruce, which comprises a large proportion of the timber stand in several of the Rocky Mountain States, is very resistant to the penetration of preservatives. The sapwood, like that of eastern hemlock, white spruce and the true firs, is difficult to distinguish from the heartwood. Up to the present, treating conditions commonly employed for Engelmann spruce have given very unsatisfactory penetrations and absorptions in both the sapwood and heartwood.

Since the chief objection to the use of this wood for ties is the difficulty experienced in obtaining a suitable treatment, experiments were undertaken at the Forest Products Laboratory to study means of overcoming this obstacle. After the laboratory experiments were completed, arrangements were made with the National Lumber & Creosoting Company and with the Union Pacific to conduct further tests at their treating plants in order to determine the best method of applying the laboratory results under commercial conditions.

A description of the service tests and observations on the results secured with some of these ties is given in an article which appeared on page 382 of the September, 1929, issue of *Railway Engineering and Maintenance*. In a general summary of his paper, Mr. MacLean drew the following conclusion:

The results of these treatments show that Engelmann spruce can be treated satisfactorily with zinc chloride, coal tar creosote, or creosote-petroleum mixtures, provided suitable treating conditions are employed.

The long time that would be required to season Engelmann spruce ties by artificial means in the treating cylinder, preparatory to treatment with preservative oils, indicates that air seasoning is much more practical and economical.

Zinc chloride solution was found in the laboratory experiments to penetrate Engelmann spruce very much better than preservative oils. Since this species takes much deeper penetrations of the water solution than of preservative oils under the same conditions of treatment, consideration should be given to the possibility of employing a two-movement treatment for ties. The zinc chloride could be used to protect the wood against decay, and petroleum alone might be found suitable to protect against checking and splitting and to help retard leaching of the preservative salt.

Incising was found to be very helpful in obtaining deep penetrations and makes it possible to use a shorter pressure period than would be required for unincised ties.

Treating conditions found satisfactory for Engelmann spruce also gave good results with white fir and lodgepole pine. The absorptions, however, were somewhat heavier in the white fir and the pine.

Other Reports

In a paper on the effect of partial seasoning of wood, T. R. C. Wilson, T. A. Carlson and R. F. Luxford, of the Forest Products Laboratory, described a series of tests undertaken to ascertain the effect of partial and non-uniform seasoning upon the strength of wood. Such information is valuable, since preservative and other treatments of green or partially seasoned timber dry the surface to a low moisture content and leave the moisture content progressively higher toward the center. The conclusions reached as a result of the tests are, in part, as follows:

As wood dries from the green condition no change in fiber strength takes place until the fiber-saturation point is reached, while a loss of moisture below the fiber-saturation is accompanied by an increase in fiber strength.

If individuals of a series of identical specimens are each dried to a different moisture content below the fiber-saturation point in such a manner that the moisture content is the same in all parts of the specimen, the strength values are definitely related to moisture content.

In material that has been air seasoned for a few months or subjected to artificial seasoning, as practiced in connection with preservative treatment, the moisture is not uniformly distributed in the piece. Ordinarily, the moisture is low at the outside surface and increases toward the center of the piece. After a few months air seasoning the moisture in the surface layer fluctuates with weather conditions about an equilibrium value, which depends on the average atmospheric temperature and humidity and varies from as low as 5 or 8 per cent in the more arid to as high as 18 or 20 per cent in the more moist regions.

A partially seasoned timber, whose average moisture content is above the fiber-saturation point value, may or may not be stronger and may be weaker than the same timber in the green condition. Whether increase in strength occurs as the result of such seasoning depends on the species and on numerous other factors.

Timber partially seasoned to an average moisture content below the fiber-saturation point may or may not have higher strength than would be expected from the average moisture content.

Because of difference in the behavior of different species when partially and non-uniformly seasoned there is little hope of being able to derive adjustment formulas applicable to partially seasoned timber.

In the early part of 1928 it became apparent to a group of engineers who are responsible for the specifications for timbers for the larger utilities, including the railways and other large consumers of the Pacific Coast, that the termite is making serious inroads upon wooden structures. Through the efforts of these engineers an advisory council was appointed by the president of the University of California to co-operate with representatives of these industries to determine the extent of the termite invasion and develop means to control this insect so as to minimize the damage it is doing.

While crossties and bridge ties are singularly free from attack by termites when in service, practically every other railway structure built of wood, including other members of wooden bridges, buildings, window and door frames in brick and concrete buildings, crossing plank, fence posts, poles, cross arms, and even let-

ter files and other records are subject to their depredations. The character of their ravages, the wide distribution of the damage they do and the almost complete destruction they cause, makes the problem of their control one of importance. So far the investigation is in its primary stage, but considerable progress has been made in the accumulation of data on the occurrence and distribution of termites in the United States and of methods which may be used in treating timbers to resist their attacks.

A paper presented by George M. Hunt, T. R. Truax and C. A. Harrison, all of the Forest Products Laboratory, on the Fire Resistance of Wood Treated with Zinc Chloride and Diammonium Phosphate, showed that the tendency of wood to support combustion can be eliminated by proper chemical treatments, although the absorptions of chemicals thus far studied, which are required for effective flame proofing, are higher than are required for preservative treatment. Both diammonium phosphate and zinc chloride, if used in sufficient quantity, are quite effective in reducing the inflammability of wood, the former being the more effective.

The Committee on Posts, of which F. McCrory, chief tie inspector, Chicago, Rock Island & Pacific, Little Rock, Ark., was chairman, reported on 10 test installations, none of which have progressed to the point where conclusions can be drawn. R. M. Wirka, associate engineer, Forest Products Laboratory, described a series of service tests which the United States Forest Service is conducting in various parts of the country to determine the durability of fence posts of different species when untreated and when treated with various preservatives and processes.

The new rules developed by the West Coast Lumbermen's Association for the grading of Douglas fir timber for structural purposes were described in a carefully prepared paper by Chester Hogue of that organization. In this paper he pointed out the basis for these structural grades, outlined their requirements and distinguished between the different grades. He also presented a table of working stresses for treated Douglas fir of the various grades, as rated under the new rules.

A paper presented by L. C. Drefahl, Grasselli Chemical Company, Cleveland, Ohio, reviewed the development in the use of zinc chloride for the preservation of wood, described the methods of injecting it into timber and pointed out fields for its further application by the railways and others for the treatment of car lumber, mill type shop and similar buildings, structures exposed to termite attack, etc.

Other reports and papers dealt with a determination of the strength of Douglas fir with relation to moisture conduct; the development of specifications for various methods of treating Douglas fir; the effect of blue stain on the penetration and absorption of preservatives; the non-pressure treatment of poles; and the study of the characteristics and toxicity of standard and other preservatives which are or might be suitable for timber treatment.

TRAFFIC THROUGH THE SEVERN TUNNEL in 1928 totaled 22,077 passenger trains and 22,683 freight trains, according to figures appearing in the Railway Gazette (London). This is an increase of 349 passenger trains and 1,741 freight trains since 1922, and is in sharp contrast to the traffic passing through the tunnel in 1887, when it was first opened, and when it was used by 7,776 freight trains. This tunnel, the longest in Great Britain, runs for 4 1/3 miles under the Severn river between England and southern Wales.

Winter Travel to Florida and California Increases

WINTER travel from Chicago to Florida and California this season has shown an appreciable increase over last season. This increase in movement is explained in part by the influence of the severe weather conditions in the north and in part by the improved service that is being offered. Before the season started, it was felt that the stock market break would tend to lessen the winter vacation movement, but this theory has been disproved by the prevailing increase in travel. Some traffic men believe that the number of people who were unable to travel south because of stock market losses has been offset by the number of persons who decided to take winter vacations in America in lieu of trips abroad.

This season's Florida movement differed from the last season's in that the peak movement developed more rapidly. The total movement from October 1, 1928, to February 5, 1929, was below that of the same period of 1927-28, but the movement after February 5 brought the total for the season above that of 1927-28. From October 1, 1929, to January 20, 1930, there has been an increase of over 10 per cent as compared with the same period of the previous season, while the prospects for the remainder of the season indicate that this margin of increase will be maintained. California business this year, like the Florida business, moved in a larger volume during the earlier part of the season and has continued to move at a rate that is 10 per cent greater than last year.

Among the improvements in service this year are shortened schedules and an arrangement whereby automobiles are handled by fast freight so that the patron can enjoy the advantages of his own car during his vacation in the south. Under this arrangement, which is in force on the Illinois Central and the Chicago & Eastern Illinois, the car may be shipped in advance of departure and will be waiting for the patron upon his arrival at destination. The charge for the shipment of an automobile is three regular one-way or round trip tickets, provided at least two additional tickets are purchased for the transportation of passengers.

The Pennsylvania, in conjunction with the Louisville & Nashville, the Central of Georgia and the Atlantic Coast Line, cut the southbound schedule of the Flamingo 1 hr. 55 min. The train leaves Chicago at 11:35 a. m. instead of 10:10 a.m. and arrives at Jacksonville at 8:45 p. m. the following day instead of 8:30 p. m., and at Miami at 7:30 the second morning instead of 8:00 a. m. Northbound, the train leaves Miami at 9:30 p. m. instead of 9:15 p. m. and arrives in Chicago at 4:00 the second afternoon instead of 4:40. In addition, the southbound schedule of the Southland was reduced 15 min., while that northbound was cut 45 min.

TWO HUNDRED TONS was the weight of waste paper gathered from the passenger cars and the station platforms of the Interborough Rapid Transit Company, New York City, in a single month recently. Every night a work train has to pick up this paper (after it is baled).

THE TELETYPE, used extensively by the New York Central in New York City and Harbor for distributing information concerning movements of freight cars, has now been installed on a line from New York City to Dewitt (Syracuse, N. Y.) 148 miles west of Albany. The system is used to transmit to New York City reports of freight cars passing Dewitt.

M-K-T Develops Conveyor for Loading Scrap

Welding plant built with oxy-torch also among new things in this road's reclaim work

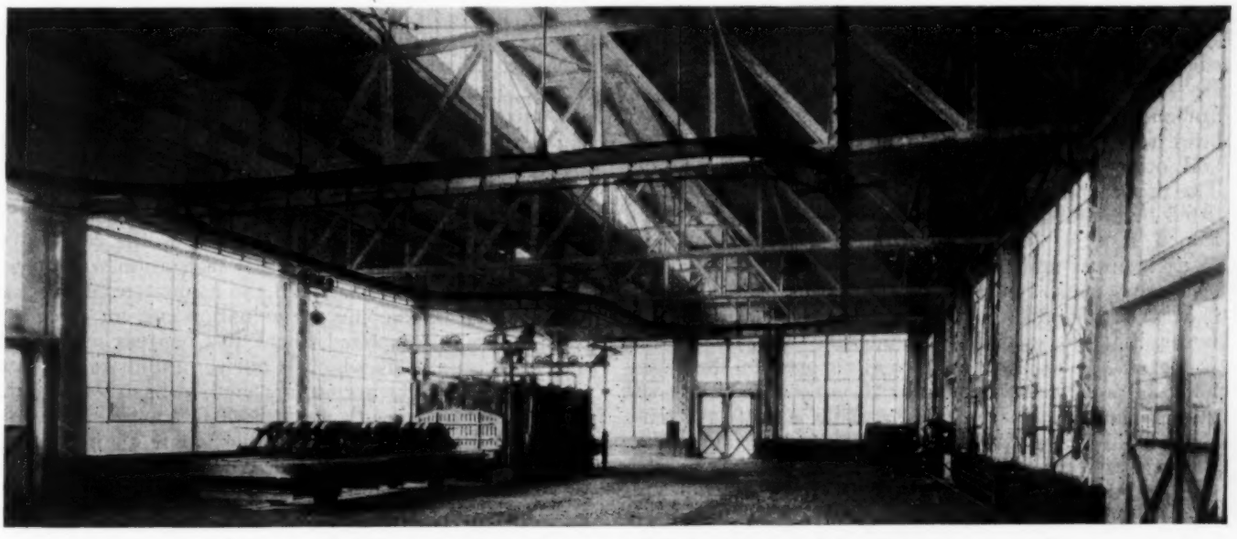
The New Scrap Iron Loader at Parsons, Kans.

THE Missouri-Kansas-Texas has made two unusual additions to its reclamation facilities at Parsons, Kan., a conveyor system for loading cars with scrap iron and a large shop for welding and annealing work which has been built of scrap iron. The innovations give a new interest to one of the largest reclamation enterprises in the country.

The scrap loader is the first machine of its kind to be used on a railroad for such work and introduces a radical departure in methods of handling scrap iron. An incline of structural steel is built alongside one of the tracks at the plant and this incline supports a power-operated apron of the endless belt type. The apron revolves so that material caught by it is carried from a shallow pit in the ground to the top of the incline where the conveyor passes over a sprocket and discharges the material into a chute. The end of this chute extends over the track and is suspended by cables passing over pulleys so that it can be lowered to fill cars and raised when the conveyor is not in use or when cars are being moved into position.

The device was constructed by purchasing a standard heavy-duty apron conveyor similar to those used by some industries and equipping it with sprockets, link chains and worm gears reclaimed from scrap machinery received at the plant. The motor and shafting had also seen service before. The steel frames were constructed from scrap four-inch I-beams and scrap boiler plate. These were fabricated by acetylene welding, in accordance with plans approved by the engineering forces of the railroad.

The equipment is used to load scrap iron, chiefly sheet materials, which have been cut in a No. 4 Alligator shear. Large quantities of sheet metals, such as steel car sides and boiler plate are constantly being received at Parsons with the scrap gathered from the shops in the vicinity or other points on the line. This material is sorted from other scrap to bring a higher



The New Annealing Shop Was Made by Welding Scrap Iron

A View of the Conveyor Showing Receiving and Discharging Hoppers

price on the market and the shear is used to improve it still further for sale. Previously, the material was loaded into cars by hand labor and a locomotive crane and magnet. This labor and also the need of the locomotive crane have been eliminated by the conveyor which picks up the scrap as fast as it drops from the shear and loads it into the cars directly.

Welding Shop Made of Scrap

The new welding and annealing shop has attracted much interest because of the provisions made and the ambitious plans which it signifies are to be put into effect for repairing worn materials adapted to recovery by welding. A furnace has already been installed in the shop, for example, that can handle the annealing of 15 truck side frames at one time. The project is distinguished, however, as an accomplishment in the utilization of scrap iron and the welding torch in shop construction. It is 45 ft. wide and 90 ft. long and conforms to modern factory-type construction even to the elimination of inside columns and yet is almost entirely made of scrap iron, fabricated by welding by the reclamation plant forces in accordance with plans prepared by the engineering department.

The wall columns are old bridge columns of the latticed type which were cut to the desired length and fitted with top and bottom plates by welding. A quantity of I-beams, channels and angles, obtained from the scrap dock, were used in framing the roof trusses, the side walls and supports for the roof. The roof trusses are 45 ft. long and support a concrete roof with a monitor and are also made strong enough to carry an overhead trolley system with which to handle heavy forgings and other materials undergoing repair in this shop. The upper and lower chords of the trusses were fabricated by welding together pieces of 4-in. by 5-in. angle iron, 7 ft. 4 in. long, there being 14 pieces of this iron in each upper and lower chord. The web members of each truss consist of 4-in. channel irons placed back to back and welded to the chords, using gusset plates between the two sections. In building the chords, two welders were used at each weld to prevent the possibility of the truss warping and all exposed edges of the gusset plates were welded to make a more rigid truss than could be obtained by riveting. After fabricating, the trusses were set up in pairs, supported only at each end, and then loaded with 80,000 lb. of steel rails. This load produced a deflection of only 5/8 in. in the trusses and no permanent set. Acetylene gas was used for the welding and, wherever possible, the welds were reinforced in order to remove all doubt of the strength of the weld.

The roof consists of a 3-in. concrete slab covered with an asphalt mastic. The entire 4,230 sq. ft. of roof was poured in the short space of 17 hours, using a locomotive crane with a 60-ft. boom to handle the concrete from the ground to the roof. The window frames are steel of the factory-type and occupy more than 50 per cent of the wall space, insuring a well-lighted and ventilated building. The outside of the building not occupied by glass is covered with 24-gage galvanized iron. The overhead carrier system installed in the building consists of chain blocks suspended from 6-in. I-beams which are supported by the roof trusses and roof purlins. The annealing furnace is a 5-ft. 6-in. by 16-ft. 6-in. unit which is pyrometrically-controlled and has two charging cars, one at each end, so that one can be loaded with material and moved into the furnace as soon as the other car comes out. The new plant will be operated under the immediate jurisdiction of G. W. Lieber, superintendent of reclamation.

Appropriations for I. C. C.

WASHINGTON, D. C.

APPROPRIATIONS amounting to $8,322,650 for the work of the Interstate Commerce Commission in the fiscal year ending June 30, 1931, are recommended by the House appropriations committee in its report on the independent offices appropriation bill submitted to the House on February 4. This is an increase of $773,825 as compared with the appropriations for 1930 but $1,007,313 less than the Budget estimate for 1931.

The committee in its report said it had disallowed the increase of $1,007,313 estimated by the Budget bureau for valuation because, "subsequent to its presentation to the Budget, the committee has learned, a radical change of procedure from that contemplated when the matter was before the Budget was decided upon by the commission. . . While it is possible the commission will require some increase in this appropriation for 1931, the committee believes the amount of the increase should be arrived at by the Budget in the light of the change of policy on the part of the commission, and an estimate submitted therefor."

No explanation was forthcoming as to the "radical change" in procedure, or as to whether the committee had seized upon the possibility of saving some money as the result of the commission's recent suggestion that the valuation be reduced to an accounting process, by simply adding net additions to the 1914 reproduction basis and subtracting depreciation, before the recommendation has even been considered by the committee to which the recommendation for legislation was made. Commissioner Lewis had told the committee, in discussing the cost of keeping the valuation current after the basic work is completed, that "if Congress would get this work on a basis which is not yet authorized by law —that is a straight accounting-method basis—we could possibly get along with about $400,000 a year." Commissioner Eastman's letter to the Senate committee on interstate commerce had also suggested a plan of shortening the recapture procedure by reaching agreements with the carriers.

The total appropriation recommended includes $141,-

000 for salaries of commissioners and secretary, $2,887,-000 for general expenses; $1,494,445 for the work of the Bureau of Accounts, an increase of $86,620; $48,000 for signal safety systems; $532,860 for general work of the Bureau of Safety, an increase of $7,860; $504,-345 for locomotive safety inspection, an increase of $45,345; $2,540,000 for valuation, an increase of $497,-000; and $175,000 for printing and binding, an increase of $68,000.

The increase for accounting is said to be necessitated by an accumulation of work of examining accounts of carriers to determine the net income subject to recapture and that involved in the refrigeration investigations.

In testimony by members of the commission before a subcommittee it was stated that during the fiscal year 1929, 671 new recapture investigations were docketed and 561 examinations were completed, although the systems whose accounts were examined averaged considerably larger. Thirty-two men from the bureau have been assigned to the investigation of refrigeration charges. An increase of 17 for the Washington office for the next year was explained on the ground that it is anticipated that the depreciation order will become effective and an increased force of 12 men will be needed for its administration. Commissioner Lewis stated that 60 per cent of the valuation staff also is working on valuations for recapture purposes. Chairman McManamy called attention to the fact that the Budget had not estimated for an increase of about $11,000 in the allotment for accounting to provide for increases in salaries.

Commissioner Lewis, who testified regarding the valuation requirements, first pointed out that in 1929 the commission had reduced its docket of formal cases from 2,706 to 2,426 and expressed the opinion that this year, with 26 new examiners and work on the consolidation plan out of the way, Chairman McManamy would be able to reduce the docket to 2,000 cases. He said that 842 tentative valuations had been made final as of their valuation dates, covering 59.1 per cent of the mileage and 81.4 per cent of the number, leaving 193 yet to be adopted, but that the work of the Bureau of Valuation, so far as the primary valuation is concerned, was more than 99 per cent completed. Of the 193 primary valuations yet to be adopted, 35 were covered by reports already submitted to the commission and 103 had been written and were being checked. On January 15, he said, 85 per cent of the staff of the bureau had been moved over to the work of bringing valuations down to date, including 60 per cent so employed on work for recapture purposes and that a "vigorous program for recapture of excess earnings" had been undertaken which called for an increase in the appropriation and which had been considered by the Budget bureau in its estimate. He also pointed out that the valuation requirement in the consolidation law might require an increase in the amount of valuation work but said that it would be premature to estimate what the amount of this increase might be.

Chairman McManamy, in discussing the safety work of the commission, said that in 1928 there were but 83 passengers killed on railways in the United States, although some 790,000,000 were carried approximately 31,000,000,000 miles. "That is a record of safety that the railroads and the commission and the government can well be proud of," he said. "About the safest place in the world you can be in to-day is on a passenger train. It is much safer than being in an automobile or going around the streets."

Looking Backward

One Hundred Years Ago

The Pontchartrain [now part of the Louisville & Nashville] was chartered on January 20, 1830, to construct a railroad from New Orleans, La., to Lake Pontchartrain at Milne [now Milneburg], about 5 miles.

Fifty Years Ago

The enormous increase in the cost of railway material within the past few months will doubtless retard the construction of much projected mileage. Last summer 60-lb. steel rails could be purchased for $47, whereas they are now $80 per ton. Rail fastenings, switch irons, frogs, and all things pertaining to the track, have increased at a similar rate, so that even where grading has been completed, the additional cost of the superstructure is a very serious item.—*Railway Age,* February 5, 1880.

In December, 1879, 42 roads in the United States, with an aggregate mileage of 23,858 or 28 per cent of the total for the country, reported earnings of 29.7 per cent more than in the corresponding month of 1878, while the mileage increased by 9.2 per cent. The average earnings per mile of these roads increased 18.8 per cent, from $576 to $684. For the calendar year of 1879 these roads earned 11 per cent more than in 1878, while their earnings per mile of line increased 5.4 per cent, from $6,927 to $7,282.—*Railroad Gazette,* February 6, 1880.

The directors of the Atchison, Topeka & Santa Fe and the Denver & Rio Grande have reached an agreement through the terms of which the receivership of the latter road will be terminated, the lease of the Rio Grande to the Santa Fe will be cancelled and the Rio Grande agrees to complete its New Mexico extension only to a point about halfway between Conejos and Santa Fe. Another provision of the agreement, which is to remain in effect for 10 years, is that the Santa Fe will have Pueblo as its terminus, abandoning the project for an extension to Leadville and Denver.—*Railroad Gazette,* February 6, 1880.

Twenty-Five Years Ago

J. J. Bernet, assistant division superintendent on the Lake Shore & Michigan Southern [now part of the New York Central], at Buffalo, N. Y., has been promoted to superintendent of the Eastern division at the same point, succeeding H. A. Worcester, who has been transferred to the Western division at Chicago.—*Railway Age,* February 10, 1905.

On January 30, the last spike was driven connecting the through line of the San Pedro, Los Angeles & Salt Lake [now the Los Angeles & Salt Lake] between Salt Lake City, Utah, and San Pedro, Cal., 1,042 miles. While the line is now open for through construction trains, through passenger and freight service may not be established for several weeks.—*Railway Age,* February 10, 1905.

Ten Years Ago

A. C. Needles, federal manager of the Norfolk & Western, and prior to federal control, general manager, has been elected vice-president in charge of operation.—*Railway Age,* February 6, 1920.

A new era in the regulation of the railroads will be inaugurated on March 1 under the terms of the agreement reached on February 4 by the conference committee that has been working since December 22 to reconcile the conflicting features of the Esch and Cummins bills passed by the House and the Senate respectively. The agreement as announced provides for a statutory rule of rate-making by which the Interstate Commerce Commission will be required to so regulate rates as to provide a net return of 5½ per cent, and railroads earning more than 6 per cent on their value will be required to contribute one-half of the excess to a general railroad contingent fund.—*Railway Age,* February 6, 1920.

Communications and Books

Further Safety Studies Needed

NEW YORK CITY.

TO THE EDITOR:

Why should not our safety departments be called upon to broaden their activities to include major breaches of safety, such as collisions between trains? This is a pertinent question for all operating officers. Our leading safety superintendents are sharp-witted men who are constantly striving to bring about the highest possible safety in every branch of railroading, and their talents ought to be availed of in all possible ways.

Recent doings of the Safety Section of the American Railway Association and the Railroad Section of the National Safety Council, and their committees, serve to emphasize the fact that the specialists in this field are now devoting themselves most of the time to very fine refinements. The thorough and careful studies made by scores of enthusiasts during the past ten years, everyone freely using the national meetings and innumerable committee meetings to impart all new kinks to every other member, have brought the more obvious features of safety work, and safety preaching, up to reasonably uniform standards; so that the pioneers are free to seek new worlds to conquer. And the only new world that has thus far been discovered proves to be nothing but the higher reaches of the world which we already know. For example, consider the newly formulated rules of the Pennsylvania, and the explanations made of them by Mr. Carrow at the Chicago safety convention in October; it may fairly be said that what he is doing is not to tell us things that we do not know, but rather telling things that we know already but *do not know well enough.*

The dearth of new avenues in which to pursue the objects which have become, as it were, standard in most railroad safety departments, suggests that other avenues ought to be sought; and the avenue that I have just suggested is one that must often have occurred to safety men who thoroughly explore their field.

The safety of men and merchandise in transit depends on the ability, skill and faithfulness of the conductors, enginemen and others who manage the trains; and the officer's part is to educate his men in these qualities. His success in this duty is measured by the freedom of his trains from damage. That the typical superintendent and the typical trainmaster have done an immense amount of good work in this branch of their duties is attested by the remarkable records of freedom from collision that can be shown in any recent annual review. That no one has yet attained perfection is, however, a fact constantly forced on our attention by the published investigations of collisions which come from the Interstate Commerce Commission month after month. The education of the railroad world by these government reports has now been going on for more than 20 years; and that this education has been in some degree effective is attested by the use that certain railroads have made of the reports in their own educational efforts. But the Bureau of Safety has to work at long range and its task is an almost impossible one; and at best its results leave much to be desired.

In particular, Director Borland's most searching analyses of the causes of collisions, showing up the faults of trainmen and officers as in a mammoth mirror, still leave unilumined the vital question of the past records of the men at fault. The reason why men make mistakes and disobey rules is to be found—or at any rate is to be looked for—in their histories; and this element of the problem the government does not cover, except perhaps in rare cases and with only partially satisfactory results.

When a single individual, by an error or a mental lapse that seems almost too small to measure, can smash up a million-dollar passenger train—to say nothing of lives and limbs—the causes need to be searched for with the utmost thoroughness; as energetically as the State searches for fugitive murderers. But do we do this? Too often the search goes no further than may be necessary to decide whether or not the employe should be discharged. The real need, however, is to throw all possible light on the thoughts, habits, health, moral character and economic condition of the individual employee, so that we may be taught how to prevent the growth of similar conditions in other employees' lives.

One of the last government investigations disclosed a telegrapher who was handling train orders while his mind apparently was *completely absorbed* in domestic difficulties or sorrows. It must be that a part at least of that kind of danger can be forestalled if suitable presentation and broadcasting of the facts of past railroad history can be brought about.

Collision reports showing three, four or five men all forgetting at the same time seem to be no less rare than they were 25 years ago, though in the last 25 years innumerable admonitions have been addressed to trainmen on the subject. That the admonitions have been given at long range is perhaps a main reason why they have not been more effectual in preventing repetitions of well-known types of carelessness.

Every government report on a collision says that the men responsible for it had (or had not) had the legal length of time off duty to rest; but whether the individual actually did rest is a question usually left unanswered. The officers of the road, in any given case, may have had it answered for themselves; and there are, without doubt, frequent cases in which the answer would be in the negative; but the fact is not widely published. Knowledge of such cases, reliably reported for the use of all railroads, ought to serve as a very salutary tonic for railroad discipline.

The fact that an engineman who wrecks an express train is well-known, from long acquaintance, to be rather slow-witted, and ought never to have been intrusted with such a train, is often a vital feature in an investigation, but it is a fact that is very unlikely to appear in a government report, and so it provides no lesson for anybody except on that particular road.

No enterprise of importance, in a difficult field like this, ever gets far toward success unless there is some one strong man who makes it his chief business. Surely, the need that is here outlined is to be classed as important, on every large road. Where better could our railroads place one of their strong men, than at the head of a committee to delve into the matter?

B. B. ADAMS.

Railway Exhibition at Chicago

GRAND RAPIDS, MICH.

TO THE EDITOR:

In the issue for October 22, 1927, page 785, you published a letter from me dealing with the Baltimore & Ohio exhibition at Halethorpe, and mentioning my visits to the railway exhibits in the technical museums at Nuremberg, Munich and Vienna. In 1929 I again visited Vienna and Nuremberg, and had a chance to go over the exhibit at each place more thoroughly.

As a result of having seen these exhibits, and in view of the approaching World's Fair at Chicago in 1933, I am convinced that there is presented to the *Railway Age* an unparalleled opportunity to be of the greatest service to the country and to the profession generally. That is to say, that the *Railway Age* should advocate the furnishing to the Chicago World's Fair, by the railroads of the country, of as complete an exhibition of their equipment, scenes along their lines, etc., as it is possible to get together. The exhibit should be of a national character, and not restricted to those roads actually entering Chicago. Advocate that the exhibit be kept together after the close of the Fair and that arrangements be made for housing it permanently for public exhibition, either free or at a moderate charge, sufficient to defray the expenses of operation. The logical organization to undertake a duty of that character is, it seems to me, the American Railway Association. Exhibit space should be allotted very liberally to the manufacturers of railway appliances, and a permanent exhibit might legitimately replace the annual show which has been held in Chicago.

Space should also be given to exhibits of the railroads in the Canal Zone, Porto Rico, the Philippines, Alaska, and Hawaii, since each of those places present a variety of problems not met with elsewhere.

The value of such an exhibition, and of the railway library which might properly be maintained in conjunction with it, should be self-evident.

I also venture to suggest that the *Railway Age* publish one or two special numbers, dealing with the railways in the territories of Alaska, Hawaii, Porto Rico and the Philippine Islands, inasmuch as I think such issues would be of great interest to railway men in this country.

WILLIAM F. KEENEY, JR.

New Books

Railroad Purchasing and the Business Cycle, by J. E. Partington. Bound in cloth. 305 pages, 6 in. by 9 in. Published by the Brookings Institution, Washington, D. C. Price $3.

It is believed quite generally that alternating periods of expansion and depression in the railway equipment industry have exercised an important influence upon the general business of the United States. Using as a basis of comparison the alternating periods of heavy buying and slack buying of railway equipment during the years from 1870 to 1926, the author tests the correctness of this theory by analyzing the relationship between the improvement or depression in general business conditions and the variations in the volume of railway equipment purchasing. The information was gathered from many reports of the sales of locomotives, freight cars, passenger cars and rails from 1870 to 1925. Definite conclusions are reached in the investigation. In an attempt to discover whether changes in the volume of orders placed by railroads precede, accompany or follow similar changes in business activity, the relationship between railroad purchasing and railroad earnings is examined as well as the relationship between railroad purchasing and the more comprehensive indexes of business activity.

The book opens with a statement of the purposes and conclusions of the study and a comprehensive outline of the sources of material and the methods followed. A chapter is devoted to each period of business history, and a large amount of statistical data and several charts are developed to serve the reader in following the text. The book is distinctive for the methodical way in which the investigations have been made and for the care taken to make the publication an authoritative work on the subject. It is timely that a book of this kind should be forthcoming when, as a result of another threatened depression in business, the railroads are being studied as an important factor in business stability.

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

Insulation From Liability Through Subsidiary Corporations, by William O. Douglas and Carrol M. Shanks. "On analysis the problem resolves itself into one of allocation of losses. The issue is whether the loss resulting from a contract or tort claim against the subsidiary will be placed on it or on the parent. In the following discussion it is assumed that such a claim exists against the subsidiary...For analytical reasons the cases will be grouped according to whether the claim is tort or contract," p. 195. Reprinted from the Yale Law Journal, December 1929, p. 193-218. New Haven, Conn., Yale Law Journal.

Rules for Car-Hire Settlement, by the Interstate Commerce Commission. Decision in Docket 17801. "This is a proceeding, instituted upon our own motion, into and concerning the rules for car-hire settlement between common carriers by railroad in the United States for the use and detention of freight cars while on the lines of carriers other than their owners..." 160 ICC 369, p. 369-448. Published by U. S. Govt. Print. Off., Washington, D. C.

Set of Outstanding Car Service Division Bulletins as of January 15, 1930. Compilation of circulars of current interest relating to grain car distribution rules, stock car distribution rules, movement of various materials, handling equipment, etc., variously paged. Issued by Car Service Division, Washington, D. C., *Apply.*

Set of Outstanding Car Service Division Bulletins as of January 15, 1930. Compilation of current bulletins relating to necessity of prompt movement of refrigerator cars, unloading of cars, peddling from cars, purpose and operation of Car Service Rules, etc., variously paged. Issued by Car Service Division, Washington, D. C., *Apply.*

Trade Standards of the Compressed Air Society. A pamphlet of trade standards adopted by this society, comprising 12 sections: (1) Nomenclature and terminology; (2) definitions; (3) standard test practices; (4) standard capacities and pressures; (5) compressor speeds; (6) installation and care of air compressors; (7) lubrication of air compressors; (8) portable compressors; (9) data, tables and formula; (10) pneumatic tool standards; (11) trade policy; (12) some uses of compressed air. Dated 1930. Pub. by the Compressed Air Society, C. H. Rohrback, Secretary, 90 West street, New York. 50 cents.

Periodical Articles

The Europe-to-Asia Through Rail Service, by Paul M. Dutko. A brief history of negotiations and services from the first conference in 1902 and the first service established in 1907 to the present time when the announced re-opening of the Chinese Eastern will make connections with Harbin possible as well as with Vladivostok. Commerce Reports, February 3, 1930, p. 338-339.

The French Railroads, 1823-1842, by Georges LeFranc. "The construction of the first French railroad, probably that at Mont Cenis, therefore, dates at least back to 1782. Thus there were 'iron roads' before 1823; but these were simply tramways built by and for private industrialists..." p. 301. Journal of Economic and Business History, February 1930, p. 299-331.

The Industrial Experts and Old Age. Editorial comment on Princeton University study on age limitations in industry and the work of commission of experts in general. Commercial and Financial Chronicle, February 1, 1930, p. 685-686.

Markings on Bullets and Shells Fired From Small Arms, by Charles O. Gunther. Takes up analysis of motion of bullet through bore of automatic pistol (caliber .45, model of 1911, U. S. Army), characteristics peculiar to bore by which bullet fired through it can be identified, interpretations of markings made on bullet surface by lands and grooves of bore and imprints on cartridge cases and primers. Illustrated. Mechanical Engineering, February 1930, p. 107-113.

The Railroad-Merger Plan of the Interstate Commerce Commission. "From the point of view of mechanical engineers, the railroad mergers are of interest in two ways. They may cost jobs to some of them through the concentration of engineering departments and the elimination of present duplications. On the other hand, the increase in efficiency which may be reasonably looked for as a result of the mergers will place in the hands of the merged companies increased funds, and these will be spent in various improvements and thus create more work. Finally, engineers as a whole are interested in the improvement of transportation generally, and there is very little reason to doubt that such an improvement will be brought about by intelligently planned mergers." Mechanical Engineering, February 1930, p. 165.

Les Tarifs de Chemins de Fer dans le Trafic International, by Pradel. Modifications suggested to facilitate international transport and traffic in Europe. Revue Politique et Parlementaire, January 10, 1930, p. 56-63.

Transport Developments in 1929. Photographs of high lights in transportation history that came into use in 1929 like the Alfred Beit Memorial Bridge over the Limpopo River, Africa, the London & North Eastern's locomotive that looks like a beetle and has a boiler pressure of 450 lb. per sq. in., the London, Midland & Scottish Ry.'s locomotive having a double boiler pressure system of 900 lb. and 250 lb. per sq. in., the opening of the Benguela and the link in the Sudan Government Railways, car retarders, high-capacity equipment and so on. Modern Transport, January 4, 1930, p. 12-13.

Odds and Ends of Railroading

Revolutionary Relic Dug Up

The leveling of a hill at Somerville, Mass., for an extension of the Boston & Maine yard facilities brought to light a relic of the Revolutionary War. It is a three-pound cannonball, three inches in diameter, and dates back to the siege of Boston in 1776.

Clerk-Magician

G. L. Walton, stores clerk for the St. Louis-San Francisco at Springfield, Mo., is an adept magician and card manipulator, whose performances are well known throughout Western Missouri. There really seems to be no end to the variety of sidelines pursued by railway employees.

Locomotive Leaps

M. A. Miot claims that, in 1900, as an engineman on the Louisville & Nashville, he drove a locomotive across a jump of 32 feet., the track for this distance being entirely unsupported and swinging in the air, as a result of a flood washing out the embankment beneath it. There are other instances of locomotives leaping across varying distances of swinging track, but this is the tallest tale of this kind.

Largest Inn-Keeper

With 35,000,000 guests a year, the Pullman company is the most extensive hotel keeper in the world. From a modest and precarious beginning 60 or more years ago, under the supervision of George M. Pullman, the Pullman company now handles more than 100,000 travelers a day. This is a yearly total equaling nearly one-third of the country's total population, the company's passengers traveling in a year a total of 13,600,000,000 miles.

The C. P. R.

The Canadian Pacific may or may not have an advertising agent on every passenger train; this department is not informed; but some bright mind must have been present when Miss C. P. R. Peterson made a trip over the line in British Columbia the other day. Her initials being what they are, how could her name (and portrait) be kept out of the papers? Impossible! How did she happen to have such a name? Why, she was born on the train. She is Christina Patricia Rosalind.

Real Golfers

Southern Pacific vice-presidents are certainly sharpshooters this winter. J. T. Saunders, vice-president at San Francisco, sank his tee shot on the 155-yd. fourteenth hole at Del Monte, Cal., on December 7. Not to be outdone, H. M. Lull, executive vice-president of the Texas and Louisiana lines, stepped out the following Saturday and won the tenth hole at the Houston Country Club with an ace. Both vice-presidents are bewailing the fact that their feats have caused all their friends to insist upon larger handicaps.

Mrs. Wilson Rides Baggage Car

Mrs. Woodrow Wilson, during her tour of China, had a taste of roughing it and rather enjoyed the experience. She visited the Forbidden City of old imperial days and made a trip to the Great Wall. This last trip entailed a three-hour ride in a baggage car on a local train which stopped at every whistling post. No special preparations had been made for Mrs. Wilson's party. The train consisted of a wheezy locomotive, five freight cars, a baggage car and a third-class passenger coach, crowded with Chinese coolies and their families. When the train conductor learned the identity of his distinguished American passenger he escorted Mrs. Wilson to the baggage car, insisting that she view the country from the open door. He provided chairs and a constant supply of piping hot tea, rice cakes and ripe persimmons which had been picked along the railroad right of way.

The Orient Express

Anything might happen to a train which crosses eight frontiers in four days and traverses the Balkans from west to east, and it is natural enough that writers of sensational fiction should make good use of the possibilities of the Orient Express. Could a better stage than its swaying corridor-carriages be found for the exploits of spy or siren, of guileless diplomatist or guileful revolutionary, or a better disguise alike for Balkan bandit and hard-pressed King's Messenger than the unobtrusive uniform of an employee of the International Sleeping Car Company?

And now, after long immunity, the famous train has really been in trouble. Before dawn, not long ago, frontier guards saw mysterious persons placing bombs on the railway line near Tsaribrod, the last station in Yugoslavia before the Bulgarian frontier. They fired, but seem to have forgotten to "flag" the Orient Express, which came puffing on and struck a bomb which derailed a mail van. The engine-driver steamed on to Tsaribrod to get help. Troops hastened to the spot and should have been just in time to satisfy the romantic proprieties by rescuing the distinguished, wealthy (and grateful) citizens of many nations and their lovely daughters from the clutches of a bandit chief. In fact, they found the passengers sleepily wondering why the train had stopped. None had seen and few had heard anything.

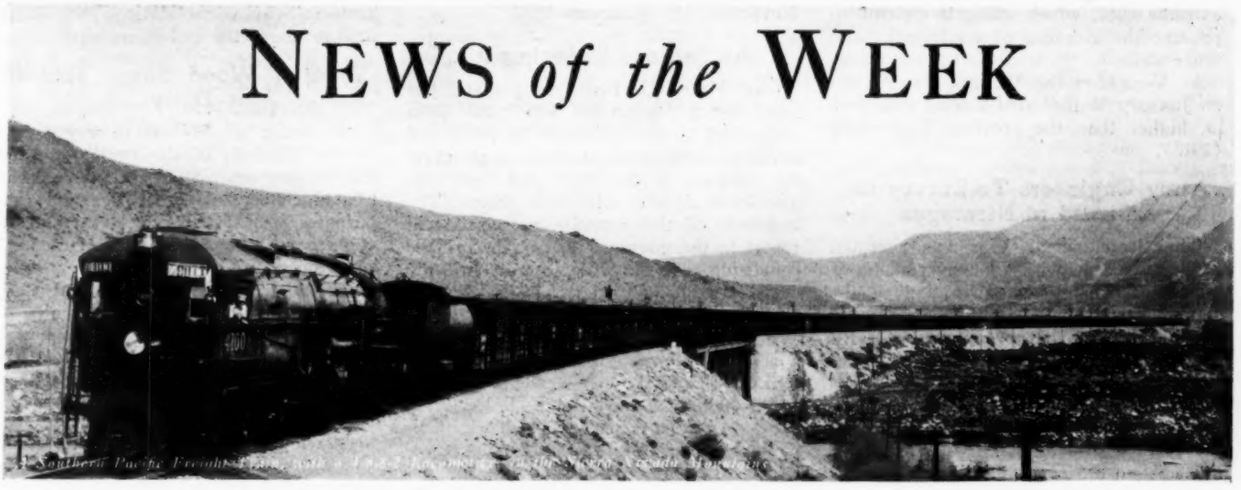
Fortunately those who were bound to Constantinople had ample time to remember what they did not see. The official inquiry instituted in Yugoslavia already claims to have discovered traces of a Bulgarian plot, though it is strange that "Macedo-Bulgar" conspirators should choose an area usually alive with Yugoslav troops, frontier guards, secret agents, and their tame Bulgarian Communists for a demonstration of this kind.

That the conspirators wished to prevent the settlement of frontier questions at issue between Yugoslavia and Bulgaria, by the delegates who were discussing them in Sofia, is probable enough. But so many individuals and organizations in both countries would find their occupation gone and their ambitions vain, if the two kingdows were really to reach a solid understanding, that an embarrassingly wide field is open to anyone who would select the culprits.—London Times.

* * *

One of the Short Lines Not Included in the Consolidation. It Carries Passengers Half a Mile on 16-in. Gage Track. Compressed Air Supplies the Motive Power, the Smoke from the Stack being merely "Atmosphere"

NEWS *of the* WEEK



Southern Pacific Freight Train with a 4-8-2 Locomotive Crossing the Mexican Cascade Mountains

THE CLERICAL EMPLOYEES of the Norfolk & Western have had their pay advanced approximately four dollars a month, the increase taking effect on February 1.

THE OHIO PUBLIC UTILITIES COMMISSION has granted the Lakeside & Marblehead permission to discontinue all passenger service, effective March 1.

THE NEW 14-STORY GENERAL OFFICE BUILDING of the Atchison, Topeka & Santa Fe at Amarillo, Tex., was opened for business on January 18. The new building replaces a frame structure which had been in service since 1903.

THE ILLINOIS COMMERCE COMMISSION on January 21 voted to ask that it be allowed to intervene before the Interstate Commerce Commission, in any railroad consolidation proceedings which involve railroads operating in Illinois.

THE LOUISVILLE & NASHVILLE has granted a wage increase of 2 cents an hour, effective January 1, to its 5,800 clerical employees. Under this classification are included gatemen and crew callers. The increase will involve an addition of about $240,000 to the annual payroll of the railroad.

BILLS FOR THE REGULATION of the operation of railroad trains have been introduced in the legislatures of Kentucky and Virginia. In both states it is proposed to stipulate the number of employees who must be assigned to the operation of a train, while in Virginia the number of freight cars allowed to be hauled in a single train would be limited.

THE RAILWAY BUSINESS WOMEN'S ASSOCIATION of Chicago will hold its fourth annual dinner at Chicago on February 8. Fred W. Sargent, president of the Chicago & Northwestern, and Miss Myrtle Miles, supervisor of the Women's branch of the Agricultural department of the New York Central, will be the principal speakers.

THE MISSOURI PUBLIC SERVICE COMMISSION in co-operation with the 54 steam railroads operating in the state has begun a survey of the 10,000 railroad grade crossings in the state to be used as the basis for a program for the future elimination of hazardous crossings. Engineering forces of the railroads will perform the field work and report to the state commission. In 1928, 56 grade crossings were eliminated by the construction of viaducts or underpasses, at an estimated cost of $1,000,000.

HARRY J. SMITH, a crossing watchman at New Hyde Park, Long Island, has been indicted by the grand jury of Nassau County, New York, on the charge of neglect of duty. A man and a woman crossing the track at this crossing about 11 o'clock on the night of January 17 were injured when their automobile was struck by an eastbound train, and it appeared that Smith had left his post about 10:20—55 minutes before his relief was due to arrive—and had engaged a boy for a fee of five cents to mind the crossing. The boy, however, went home as soon as Smith was out of sight.

P. R. R. Has 196,119 Shareholders

The management of the Pennsylvania has announced that on January 1 a record number of individual shareholders was reached with 196,119 individuals listed as owners of the property. This is the fourth month in which ownership has risen to record-breaking totals for wide-spread distribution. A large proportion of the increase is accounted for by the addition of many employee stockholders.

Budd Invited to Study Russian Railways

Ralph Budd, president of the Great Northern, has been asked by the Soviet Republic of Russia, through the Amtorg Trading Corporation of New York, the official Soviet economic organization in the United States, to make a study in that country of the Russian railways with a view to their reconstruction to American standards of efficiency. The invitation was extended by M. Rudzutak, commissariat of communications of the Soviet Republic at Moscow. If Mr. Budd accepts the mission, it is expected that he will leave June 1 for a period of three months.

Roller Bearings on Coal Cars

The Pennsylvania, in collaboration with the Timken Roller Bearing Company, has equipped 100 hopper cars of 70 tons capacity with roller bearings to determine the comparative resistance of cars so equipped as compared with standard cars. The cars, which have been put in service on a run between Cresson division points and the eastern seaboard, will soon be taken to Trinway, Ohio, where they will be tested under varying conditions of temperature, grade and speed.

Junior Safety Workers' League

This is the name of an organization of school children which was started last year by the Safety Department of the Buffalo, Rochester & Pittsburgh and in which the number of boys and girls now enrolled, at the schools along the line of the road, is 9,765; boys 4,905, girls 4,860. The members sign pledges not to walk on tracks, not to play around turn tables, etc. In a circular describing this movement, the railway company thanks the school teachers who have aided in forming the league. The slogan of the league, prescribed by the B. R. & P., is B. R. & P., that is to say, Believing, Recommending and Practicing Carefulness at all times.

Wabash River Flood Interrupts C. & E. I. in Indiana

High water in the Wabash River valley in Southern Indiana interrupted train service on the Chicago & Eastern Illinois between Terre Haute and Vincennes for about six days during January. Water covering the tracks forced the detouring of trains on January 13. On the following day the breaking of a levee permitted the resumption of service until January 15, when a further rise flooded the tracks causing a second suspension which continued until January 20. During this interval trains were detoured over other lines. While actual damage to the track by the washing out of the roadbed and ballast was slight, the maintenance forces

were handicapped in their work by the extreme cold, which made it difficult to prevent the freezing of track jacks and other tools.

At Vincennes the Wabash River gage on January 16 indicated a level nearly 15 in. higher than the previous high mark (1913).

Army Engineers To Survey for Railroad in Nicaragua

The Secretary of War has accepted an arrangement with the government of Nicaragua whereby the battalion of the United States Army engineers now engaged in making a survey of a route for a canal through Nicaragua will, in addition to this work, survey for a railroad from Lake Nicaragua to the Atlantic coast, via the San Juan river valley. This survey when completed will be made available to the government of Nicaragua.

In return the government of Nicaragua will furnish free transportation of men and supplies on the railroad and lake steamers belonging to the Pacific Railroad of Nicaragua.

Canadian Railway Club Annual Banquet

The twenty-seventh annual banquet of the Canadian Railway Club, was held on January 25 at the Windsor Hotel, Montreal. More than 700 railway men, including several guests from the United States, attended.

The speakers were Mayor Houde of Montreal; Walter Molson, president of the Montreal Board of Trade; J. J. Scully, general manager of eastern lines, Canadian Pacific; and W. H. Winterowd, vice president of the Lima Locomotive Works at New York and former president of the Canadian Railway Club. H. J. Humphrey, assistant to the vice-president of the Canadian Pacific and president of the club, presided.

Dr. Elmer A. Sperry Honored by Iron and Steel Institute

Dr. Elmer A. Sperry of Brooklyn, N. Y., has been awarded the American Iron and Steel Institute medal for his work in connection with the development of methods for detecting flaws in steel rails. This award is one of two medals given by the institute in memory of Elbert H. Gary, its founder and first president, and Dr. Sperry is the first recipient.

While the award was made at a general meeting of the institute on October 25, 1929, the presentation was delayed by reason of Dr. Sperry's absence from the country, and thus took place on January 31. Charles M. Schwab, chairman of the board of the Bethlehem Steel Corporation and president of the American Iron and Steel Institute, made the presentation. The award was based on Dr. Sperry's paper entitled "Non-Destructive Detection of Flaws," in which he described the methods which he had developed for detecting these flaws in rails, and later applied to the testing of welds in bars, plates and rods.

The process and apparatus developed by Dr. Sperry for the detection of these flaws in steel rails was described in an article appearing in the *Railway Age* of November 17, 1928, page 955.

An Indiana Experiment

Gov. Harry G. Leslie of Indiana has appointed a commission which has been authorized by the legislation to study and develop a solution of problems confronting the railways in that state and their employees in dealing with each other. The members of the commission, which will report to the governor 90 days before the convening of the 1931 session of the legislature, include O. P. Reese, general superintendent, Pennsylvania; Phillip T. White, general superintendent, Cleveland, Cincinnati, Chicago & St. Louis; Frank E. Lewis, general superintendent, Chicago, Indianapolis & Louisville; F. J. De Grief, general superintendent, New York, Chicago & St. Louis; Roscoe Martin, representing Brotherhood of Railway Conductors; William Lee, Brotherhood of Locomotive Firemen and Enginemen; and G. H. Griswold, Brotherhood of Railroad Trainmen.

Ohio Full-Crew Law

The Supreme Court of Ohio has sustained an order issued by the Public Utilities Commission of that state directing the New York Central, in using a locomotive crane for switching service to man the locomotive with a full crew, according to the Ohio statute, Section 12557-1, which requires that a switching engine must have an engineman, a fireman, a conductor and at least two helpers. The full-crew law being accepted as constitutional, the only question was whether or not the locomotive crane should be called a locomotive; and the court decided that it should. It appears that this locomotive crane was used to move cars from place to place in the Stores yard, at Thurston, sometimes moving cars as far as a quarter mile; sometimes moving four cars at one time and sometimes crossing the main track. The decision was by Judge Matthias and was published on December 11, 1929.

Funds Provided for Railroad Ownership Investigation

An expenditure of not to exceed $25,000 by the House Committee on interstate and foreign commerce for its investigation of railroad ownership, and particularly the relations between railroads and holding companies and investment trusts, was authorized by a resolution adopted by the House on February 1. Chairman Parker of the committee stated, however, that if the investigation is to amount to anything it will cost several times $25,000, "for the reason that we are going to attempt to investigate some of the strongest corporations in the United States and we have got to have as good legal talent as there is in the country and as good accountants as we can find." Mr. Parker said there is no intention to "prosecute or protect any corporation or individual" but to find out the actual facts as to the possibility of non-operating corporations nullifying the efforts of the Interstate Commerce Commission to keep railway consolidations within the limitations of the public interest.

Treated Wood Saves $145,000 Daily

"A saving of $145,000 a day accrues to the railroads of the country through the present practice of using chemically treated timber for cross ties and other purposes," said C. C. Cook, maintenance engineer of the Baltimore & Ohio, at a conference of the public utility group of The National Association of Purchasing Agents, held at the Department of Commerce in Washington on January 23. Mr. Cook addressed this meeting as a member of the National Committee on Wood Utilization of the Department of Commerce.

"Since 1909," Mr. Cook said, "the consumption of treated wood in this country has increased from 75 million to 336 million cubic feet. The railroads consume three-fourths of this quantity at the present time, largely for ties. The life of chemically treated ties is frequently treble that of untreated ties." The speaker predicted that the average life of ties will soon be more than 20 years. When this is true, he said, the railroads will save $287,000 a day.

P. R. R. Safety Awards

The Pennsylvania has extended the scope of the competitive safety campaign, the President's Safety Trophy Contest, which is conducted each year. Heretofore five trophies have been awarded yearly to the regions making the best safety records in five departments, namely, in maintenance of way, maintenance of equipment, station, train service and engine service. At the close of this year a total of 21 trophies will be presented covering competition among the regions as complete entities, the general divisions, the divisions and the departments of divisions. The regional departmental trophies will be discontinued. The awards will be based on the lowest number of casualties to employees on duty per million man-hours.

In order that a fair and equitable competitive basis may be established the divisions will be arranged in three groups according to the number of man-hours worked, and separate awards will be made to the winning division in each group. In the division departmental competition, the group arrangement will be adhered to. A special trophy will be awarded the Altoona Works if they surpass the records of the regions in the maintenance of equipment department.

Impact Recorders

J. N. Haines, superintendent of transportation of the Lehigh Valley, speaking before the January meeting of the Atlantic States Shippers' Advisory Board, in New York City, told of the experience of the Lehigh Valley and other roads with impact recorders. He said that the machine gave useful information not only about rough handling of freight but also brings out cases of poor loading, poor

storing and insufficient bracing. Defects disclosed by the use of the machine have enlisted the interest not only of the railroad company's freight handlers but also many shippers. Shippers have in some instances asked to have recorders placed in cars which they send out, desiring to perfect their own packing and loading methods. Recorders are used in some instances in cars going over two or more roads, the two carriers co-operating.

In Chicago, recorders are now extensively used in cars used to move freight from one road to another and their use in this class of service is to be introduced at New York.

Answering the alleged suspicion of some shippers that this machine is used to stave off claims for damage, Mr. Haines said that, to the best of his knowledge, the recorder records had never been used in the discussion or settlement of any claim so far as the shipper or consignee is concerned.

The machines have been used with satisfaction on passenger trains.

N. Y. State Grade Crossings

Questions concerning disputed points relative to the apportionment of cost, between the railroads and the state, in connection with the abolition of grade crossings are at the present time the subject of 50 or more suits in the courts of New York state, wherein the railroads have questioned the rightfulness of orders which have been issued by the Public Service Commission; and because of the gravity of these questions the attorney general has designated a deputy attorney general, William B. Zimmer, to take charge of the interests of the state in these suits.

The state of New York is now the scene of more grade crossing elimination projects than any other state, the sum of three hundred million dollars having been appropriated from the state treasury on this account a few years ago. The questions to be settled in these pending suits relate to the right to require the railroads to bear their usual share (50 per cent) of the cost of viaducts or subways for a width greater than present roadways; the extent to which they must bear the expense of approaches, and what constitutes an approach; the extent to which they should be charged for the diversion of a highway or road where required for a grade cossing elimination, and the powers and authority of the public service commission generally in making rulings on these matters.

General Railway Signal Company Annual Report

Net income of $3,118,345, after allowances for taxes and depreciation, was reported by the General Railway Signal Company for the year ending December 31, 1929, according to the annual report issued on January 23. The foregoing net figure was equivalent, after the payment of preferred dividends, to earnings of $8.25 per share on the company's outstanding common stock. It compares with the 1928 net of $2,423,395, or the equivalent of $5.25 per share on the common stock. Per share earnings on the common in 1927 amounted to $7.78. Selected items from the consolidated income statement follow:

	1929	1928
Gross operating income..	$5,007,127	$3,288,910
Selling, administrative and general expenses..	1,324,671	1,146,200
	$3,682,456	$2,142,710
Deduct:		
Depreciation, amortization and miscellaneous charges	470,654	192,951
Less interest received, dividends, and miscellaneous income	456,543	473,636
	$ 14,111	$ 280,685
Net income before taxes	$3,668,345	$2,423,395
Deduct Federal and State taxes (estimated)	550,000	375,000
	$3,118,345	$2,048,395

An interesting feature of the report is the announcement that during the stock market crash of last fall, the directors of the General Railway Signal Company took advantage of the low prices in the securities market to purchase some of the company's stocks. In this connection, 20,550 shares of the common stock at an average cost of $80.29 and 4,691 shares of preferred stock at an average cost of $100 were acquired.

W. W. Salmon, president, in his remarks to the stock holders, treats of the 1929 business and prospects for 1930, in the following manner:

The dollar value of unfilled orders on hand January 1, 1929, was 23.5 per cent greater than at the same period in 1928. Volume of orders booked in 1929 was almost equally divided between the first and second half of the year and was 57 per cent greater than in 1928. Value of orders executed in 1929 was 34 per cent greater than in 1928. Volume of unfilled orders on hand January 1, 1930, is 99 per cent greater than on January 1, 1929. Prospects for booking new business in 1930 are good.

In 1929, orders were received from 20 railways, for 39 interlocking machines, having a total of 2,245 levers; from 20 railways for 9,535 electric signals; for car retarder equipment of the classification yards of the New York, New Haven & Hartford at Providence, the Michigan Central at West Detroit, and the New York Central at Buffalo (Gardenville). Orders were also received from 9 railways for the equipment of 249 locomotives with automatic train control devices, and from 14 railways for 14 major and 16 minor installations of our recently developed Centralized Traffic Control System. * * * Value of repair and renewal orders for 1929 was 50 per cent greater than in 1928, thus maintaining the trend of several years past.

C. P. R. Net Off in 1929

A slight decrease in operating net for the month of December, as compared with the same month of the previous year, is shown in the Canadian Pacific's statement of earnings and expenses for December. The road's operating net of $3,153,268 compares with $3,156,773 in December, 1928—a decrease of only $3,505. Considering that the railway was handicapped by a continuance of the wheat tie-up and the consequent decrease in gross revenue, this is considered to be a good showing, and was accomplished by effecting economies in operating expenses. Gross revenue of $15,518,232 was lower by $5,573,865, but operating expenses were reduced by $5,570,359.

For the twelve months ended December 31, operating net was $43,144,543, as compared with $51,694,451 in the previous year, a decrease of $8,549,907. By the same comparison, gross revenues are shown decreased by $19,308,341, while operating expenses were lower by $10,758,433.

The following table shows the revenues and expenses for the month of December and for the twelve-month period ending with December, with comparisons:

	1929	1928	Dec.
DECEMBER			
Gross ...	$ 15,518,232	$ 21,092,097	$ 5,573,865
Exp.	12,364,963	17,935,323	5,570,359
Net oper.	$ 3,153,268	$ 3,156,773	$ 3,505
TWELVE MONTHS			
Gross ...	$209,730,955	$229,039,296	$19,308,341
Exp.	166,586,411	177,344,845	10,758,433
Net oper.	$ 43,144,543	$ 51,694,451	$ 8,549,907

Survey Shows 1,900 Route Miles Electrically Operated

Eighteen railroads in the United States, which formerly operated entirely by steam, now operate electrically on about 4,300 miles of track, according to a survey of railroad electrification just completed by the Copper & Brass Research Association.

This electrification represents about 1,900 miles of route, while of the 4,300 miles of track approximately 3,150 miles are in main lines. In this electrified territory the railroads have in service 465 electric locomotives and 2,750 multiple-unit cars for passenger service. Of these cars, 2,150 are motor cars and the rest are trailers.

In addition to the electrification already completed, six railroads have similar work under construction, two railroads have definitely announced further electrification programs, and six new projects have been tentatively announced. Definitely authorized projects, says the survey, will within five or six years almost double the present electrified mileage of the steam railroads.

The survey further points out that although less than one per cent of the route mileage of American railroads is now electrically operated, more than 100,000,000 pounds of copper have been required for the various undertakings, and that other definite projects will within a few years practically double the poundage of copper applied in railroad electrification.

Bonuses on New York Subways

The Brooklyn-Manhattan Transit Company, operating rapid transit subways in Manhattan, and subways and elevated lines in Brooklyn (New York City) pays considerable sums in bonuses to employees whose records are clear for prescribed periods.

Bonuses paid in December, 1929, amounted to $52,584, the beneficiaries of this sum numbering over 1,800. These rewards go to motormen, motor switchmen, conductors and trainmen. A sample statement from a long account, printed in the employees' magazine, shows, for a period of five months ending with November, 1929, payments of $50 to one motorman, $45 to one, and also the following: twenty-nine $35 awards; 167 of $30 each;

(*Continued on page 404*)

Revenues and Expenses of Railways

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1929

Name of road		Av. mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net ry. operating income.	Net ry. operating income, 1928.
Akron, Canton & Youngstown	Dec.	171	$204,060	$125	$213,793	$60,308	$21,409	$13,946	$66,566	$21,223	$183,177	85.7	$30,616	$26,753	$5,065	$29,344
	12 mos.	171	3,665,845	1,690	3,809,447	560,550	316,877	168,159	930,460	216,212	2,187,533	57.4	1,621,914	1,369,925	992,094	722,461
Atchison, Topeka & Santa Fe	Dec.	9,653	10,869,730	2,742,781	15,585,822	2,982,375	3,303,168	441,414	5,068,652	489,904	12,156,188	78.0	3,429,634	2,559,503	2,523,317	4,886,924
	12 mos.	9,662	165,592,822	34,638,533	221,821,610	33,562,629	40,625,925	5,024,289	60,397,912	5,354,421	144,392,934	65.1	77,428,676	59,222,797	59,149,787	48,833,752
Gulf, Colorado & Santa Fe	Dec.	1,943	2,324,416	182,215	2,721,366	474,570	469,978	59,763	730,642	81,418	1,763,249	64.8	958,117	773,502	634,603	672,825
	12 mos.	1,944	26,066,529	2,129,533	30,234,223	6,003,249	5,380,046	679,416	8,504,375	899,344	21,297,132	70.4	8,937,091	7,516,749	6,033,220	5,293,466
Panhandle & Santa Fe	Dec.	1,569	1,273,755	112,856	1,508,578	402,595	284,663	20,163	439,436	50,354	1,187,061	78.7	321,517	279,321	154,959	117,258
	12 mos.	1,542	16,003,118	1,276,893	18,561,801	3,652,198	3,033,757	237,967	4,926,898	452,045	12,108,534	65.2	6,453,167	5,957,535	4,442,379	4,384,391
Atlanta & West Point	Dec.	93	127,268	51,520	208,287	27,982	35,257	13,250	88,414	13,994	183,465	88.1	24,822	14,627	—2,201	3,624
	12 mos.	93	1,909,698	581,155	2,885,412	386,565	493,838	149,449	1,098,260	162,893	2,347,150	81.3	538,262	370,375	200,436	316,309
Western Ry. of Alabama	Dec.	133	151,873	56,628	234,293	42,640	40,817	13,303	82,096	13,247	195,386	83.4	38,907	33,353	43,135	18,620
	12 mos.	133	2,074,400	624,887	3,022,299	530,075	572,314	153,274	993,800	161,071	2,458,801	81.4	563,498	380,775	434,117	677,723
Atlanta, Birmingham & Coast	Dec.	639	285,842	25,823	355,101	87,300	97,657	29,164	151,696	18,113	393,672	110.9	—38,571	—44,074	—58,082	—43,726
	12 mos.	639	3,889,191	269,482	4,719,692	1,098,872	1,017,888	338,606	1,836,424	221,329	4,644,372	98.4	75,320	—109,680	—257,461	—188,371
Atlantic Coast Line	Dec.	5,153	4,105,837	926,651	5,810,843	767,528	1,138,952	191,022	2,012,423	178,649	4,344,610	74.8	1,466,233	941,742	956,698	1,286,091
	12 mos.	5,151	53,188,639	12,132,623	72,371,894	10,181,059	13,874,060	1,991,845	24,667,140	2,095,193	53,431,589	73.8	18,940,305	12,654,512	12,874,207	9,895,362
Charleston & Western Carolina	Dec.	342	194,261	11,932	217,569	35,649	37,283	6,761	92,302	7,624	179,590	82.5	37,979	29,948	31,880	62,612
	12 mos.	342	2,895,589	125,187	3,153,362	645,831	455,258	84,904	1,142,247	87,412	2,415,157	76.6	738,205	481,476	460,157	546,531
Baltimore & Ohio	Dec.	5,658	14,145,321	1,756,671	17,124,170	1,797,839	4,081,029	495,825	6,522,415	686,254	13,763,934	80.4	3,360,236	2,690,616	2,441,903	3,692,681
	12 mos.	5,666	205,489,402	22,138,627	245,418,776	29,418,140	51,765,468	5,948,432	82,958,813	8,250,057	180,570,034	73.6	64,848,742	52,916,043	49,184,110	49,387,716
Baltimore & Ohio Chic. Term	Dec.	85	.....	.....	289,342	Cr. 46,034	36,823	2,544	179,613	20,600	198,787	68.7	90,555	—71,585	109,423	139,148
	12 mos.	85	.....	.....	4,392,489	424,986	527,101	28,688	2,176,245	218,182	3,425,063	78.0	967,426	105,096	1,426,347	1,453,033
Staten Island Rapid Transit	Dec.	23	63,569	123,163	196,274	Cr. 65,114	15,463	2,285	109,972	28,064	90,670	46.2	105,604	87,156	77,226	22,715
	12 mos.	23	880,406	1,602,113	2,637,897	178,453	203,652	25,128	1,282,922	202,192	1,892,347	71.7	745,550	535,285	460,515	349,650
Bangor & Aroostook	Dec.	619	652,687	78,266	765,589	87,103	284,262	6,389	203,823	30,860	614,014	80.2	151,575	123,149	118,600	99,696
	12 mos.	619	7,073,357	580,068	8,135,674	1,303,873	1,662,349	69,164	1,953,561	321,962	5,340,514	65.6	2,795,160	2,181,254	2,277,600	1,899,190
Belt Ry. Co. of Chicago	Dec.	48	.....	.....	601,596	36,091	69,904	3,833	311,172	14,442	435,442	72.4	166,154	115,426	146,983	137,381
	12 mos.	48	.....	.....	8,299,174	737,518	906,506	45,266	3,743,377	176,126	5,608,793	67.6	2,690,381	2,004,934	1,798,069	1,760,958
Bessemer & Lake Erie	Dec.	227	682,396	7,127	706,941	125,738	331,108	14,392	279,727	40,244	794,827	112.4	—87,886	103,544	153,168	—297,005
	12 mos.	227	17,549,906	87,524	17,912,973	1,344,592	3,961,144	170,139	3,897,642	429,619	9,786,093	54.6	8,126,880	7,227,063	7,495,321	5,207,732
Bingham & Garfield	Dec.	33	38,583	.....	39,650	16,596	7,426	1,851	10,508	5,338	41,855	105.6	—2,205	—2,497	14,379	24,289
	12 mos.	33	525,524	.....	551,227	105,477	71,884	18,921	129,020	54,675	381,679	69.2	169,548	43,270	244,296	216,751
Boston & Maine	Dec.	2,077	3,970,789	1,349,923	6,167,116	1,522,279	960,960	96,117	2,207,808	236,630	5,048,420	81.9	1,118,696	891,627	609,470	902,491
	12 mos.	2,078	51,916,729	16,235,042	78,481,438	14,381,312	13,997,723	1,099,745	27,004,923	2,643,324	59,408,942	75.7	19,072,496	15,568,622	12,642,198	12,785,300
Brooklyn Eastern Dist. Term	Dec.	11	98,348	.....	100,779	9,533	13,550	16	37,863	7,866	68,828	68.3	31,951	26,811	26,811	37,674
	12 mos.	11	1,391,260	.....	1,425,378	114,687	188,146	6,214	495,186	80,802	885,035	62.1	540,343	453,842	453,842	477,082
Buffalo & Susquehanna	Dec.	253	145,573	1,050	157,375	23,752	48,744	1,870	47,688	6,755	128,809	81.8	28,566	26,460	44,183	52,752
	12 mos.	253	1,619,073	10,921	1,767,549	352,319	610,966	22,866	537,218	91,766	1,615,135	91.4	152,414	146,301	344,329	321,448
Buffalo, Rochester & Pittsburgh	Dec.	601	1,318,125	85,885	1,455,946	160,003	379,988	38,774	568,301	45,353	1,197,203	82.2	258,743	197,871	188,949	172,107
	12 mos.	601	16,305,858	850,823	17,830,225	2,306,534	4,919,545	411,971	6,406,096	529,835	14,587,868	81.8	3,242,357	2,640,662	2,910,286	2,773,386
Canadian Pacific Lines in Maine	Dec.	233	185,390	40,092	240,160	23,743	52,651	7,377	110,709	4,012	198,492	82.6	41,668	26,613	1,220	3,752
	12 mos.	233	2,228,441	377,356	2,763,328	641,285	593,827	86,357	1,248,371	49,116	2,618,956	94.8	144,372	—30,983	—282,820	—319,991
Canadian Pacific Lines in Vermont	Dec.	85	82,280	32,902	136,223	3,997	29,303	1,940	83,098	2,613	120,948	88.8	15,275	11,087	—22,593	—31,215
	12 mos.	85	1,385,462	427,613	2,089,853	397,153	351,772	22,555	1,093,866	28,688	1,892,901	90.6	196,952	148,210	—264,489	—1,120,738
Central of Georgia	Dec.	1,944	1,334,372	286,046	1,867,579	154,747	344,636	68,765	787,636	83,332	1,443,946	77.3	423,633	350,190	373,907	368,079
	12 mos.	1,944	19,060,874	3,431,606	25,033,992	3,381,879	4,397,931	844,781	9,333,788	1,040,443	19,134,802	76.4	5,899,190	4,359,728	4,508,457	4,449,824
Central of New Jersey	Dec.	690	3,640,174	701,649	4,643,990	496,104	893,299	58,323	1,822,049	124,930	3,422,554	73.7	1,221,436	857,905	737,504	460,882
	12 mos.	690	45,043,293	9,168,668	58,136,940	5,796,292	11,955,091	744,786	21,813,140	1,564,484	42,218,296	72.6	15,918,644	10,832,888	9,367,044	9,385,057
Central Vermont	Dec.	419	407,230	106,980	580,858	66,938	84,300	19,726	276,647	27,119	476,693	82.1	104,165	87,861	71,808	2,495,921
	12 mos.	417	6,591,890	1,202,007	8,854,341	1,649,780	1,168,921	223,474	3,500,956	306,656	6,875,476	77.7	1,978,865	1,770,337	1,805,843	1,281,954
Chesapeake & Ohio	Dec.	2,735	9,588,651	537,359	10,573,627	1,180,069	2,588,287	139,681	2,660,006	335,720	6,927,229	65.5	3,646,398	2,693,349	2,857,535	3,654,098
	12 mos.	2,732	118,056,031	6,397,520	129,779,115	18,671,233	29,016,914	1,637,569	32,409,583	3,572,580	85,514,857	65.9	44,264,258	35,609,546	37,881,633	36,323,594
Chicago & Alton	Dec.	1,028	1,466,539	500,232	2,219,063	222,174	553,563	81,730	853,662	62,154	1,788,233	80.6	430,830	320,863	163,395	357,430
	12 mos.	1,028	19,900,898	5,454,297	28,728,354	3,432,217	6,331,558	949,053	10,444,157	735,096	22,023,502	76.7	6,704,852	5,355,237	3,278,828	2,750,872
Chicago & Eastern Illinois	Dec.	946	1,465,143	328,562	1,975,655	167,973	487,947	33,255	800,780	70,590	1,573,959	79.7	401,696	251,665	93,340	308,870
	12 mos.	946	19,534,919	3,410,201	25,398,275	3,011,916	5,356,770	941,943	9,360,420	853,353	19,693,097	77.5	5,705,178	4,026,308	2,209,033	2,200,674
Chicago & Illinois Midland	Dec.	131	268,704	11,274	296,033	43,576	52,511	18,220	85,699	18,925	218,899	73.9	77,134	71,109	70,548	108,184
	12 mos.	131	2,874,969	70,063	3,052,413	447,580	631,698	230,518	856,252	213,110	2,374,838	77.8	677,575	578,155	563,572	530,715
Chicago & North Western	Dec.	8,458	7,212,808	2,067,469	10,905,620	2,140,453	2,210,911	229,637	4,624,464	393,620	9,645,795	88.4	1,259,825	329,946	66,333	50,016
	12 mos.	8,465	112,029,702	23,863,937	154,732,947	22,000,107	28,536,624	2,650,107	56,832,275	4,634,701	115,286,040	74.5	39,446,907	29,190,441	26,220,149	23,225,683

Revenues and Expenses of Railways

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1929—CONTINUED

Name of road		Av. mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net ry. operating income.	Net ry. operating income, 1928.
Chicago, Burlington & Quincy	Dec.	9,366	$9,431,034	$1,502,827	$12,354,857	$1,590,397	$2,518,859	$288,751	$4,443,418	$414,174	$9,362,100	75.8	$2,992,757	$2,828,880	$2,536,036	$2,104,544
	12 mos.	9,373	126,777,844	18,817,973	162,409,925	24,414,605	26,080,966	3,353,452	52,083,144	4,508,565	111,565,543	68.7	50,844,382	38,792,426	35,357,963	32,912,367
Chicago Great Western	Dec.	1,495	1,516,600	234,109	1,958,157	239,972	306,305	77,743	765,616	74,780	1,469,427	75.0	488,730	391,723	221,056	241,889
	12 mos.	1,495	20,739,859	2,813,774	25,825,337	3,406,912	4,372,253	990,157	10,279,126	707,923	19,867,072	76.9	5,958,265	4,855,790	2,801,534	2,510,393
Chicago, Indianapolis & Louisville	Dec.	647	1,085,160	163,730	1,385,455	104,180	252,709	38,897	495,817	37,591	941,634	68.0	443,821	371,989	237,256	260,595
	12 mos.	650	14,167,913	1,937,073	18,078,394	1,822,785	3,692,141	479,727	6,319,514	445,766	12,908,741	71.4	5,169,653	4,092,986	2,603,564	2,696,936
Chicago, Mil., St. Paul & Pacific	Dec.	11,247	9,419,466	1,404,865	12,225,758	1,337,949	2,606,023	295,978	4,916,274	412,360	9,617,746	78.7	2,608,012	1,890,382	1,456,616	2,216,835
	12 mos.	11,248	137,176,431	16,753,297	171,361,385	27,885,867	31,136,446	3,863,536	60,471,448	4,647,003	128,800,861	75.2	42,560,524	32,899,023	26,274,323	29,119,053
Chicago River & Indiana	Dec.	20	.....	.....	531,267	36,982	55,764	488	199,227	16,389	308,850	58.1	222,417	199,336	265,294	337,759
	12 mos.	20	.....	.....	7,069,100	540,210	637,565	6,046	2,530,074	181,752	3,895,647	55.1	3,173,453	2,650,778	3,659,575	3,435,220
Chicago, Rock Island & Pacific	Dec.	7,592	7,503,948	1,640,961	11,246,027	1,385,850	2,131,780	295,858	4,164,601	228,351	8,312,727	73.9	2,933,300	2,438,076	2,000,881	1,900,829
	12 mos.	7,567	106,798,838	18,622,819	139,470,580	19,451,125	26,572,725	3,214,763	49,658,011	4,132,551	104,024,478	74.6	35,446,102	27,565,710	21,971,128	22,395,774
Chicago, Rock Island & Gulf	Dec.	566	534,689	66,050	709,287	50,444	54,747	21,051	201,136	20,167	352,070	49.6	357,217	330,799	298,247	148,647
	12 mos.	543	6,798,200	765,349	8,250,983	799,723	721,531	254,940	2,487,956	227,897	4,530,907	54.9	3,720,076	3,355,984	2,877,781	1,870,741
Chic., St. Paul, Minn. & Omaha	Dec.	1,746	1,666,252	312,850	2,172,306	460,710	582,781	39,404	1,126,028	82,901	2,306,274	106.2	—133,968	—205,926	—277,121	—207,241
	12 mos.	1,746	20,685,592	4,023,442	27,218,998	4,031,566	4,978,404	477,228	11,451,794	985,462	22,069,240	81.1	5,149,758	3,807,147	2,968,733	1,857,815
Clinchfield	Dec.	309	445,375	15,444	501,720	44,503	129,461	21,385	113,625	17,365	326,594	65.1	175,126	134,884	209,123	238,972
	12 mos.	309	6,475,255	166,656	6,783,240	724,252	1,722,032	263,827	1,403,277	221,144	4,333,574	63.9	2,449,666	1,649,260	2,713,355	3,000,430
Colorado & Southern	Dec.	1,035	873,559	74,981	1,038,702	171,423	107,423	14,028	367,851	45,653	705,735	67.9	332,967	245,051	234,204	160,297
	12 mos.	1,035	10,029,790	1,123,066	12,230,276	1,982,817	2,354,502	186,181	4,170,856	508,948	9,234,641	75.5	2,995,635	2,085,882	1,774,618	1,957,437
Ft. Worth & Denver City	Dec.	696	745,054	143,164	970,485	142,483	123,719	21,609	295,994	37,446	625,109	64.4	345,376	277,100	269,588	323,517
	12 mos.	696	9,806,113	1,734,304	12,396,410	1,613,038	1,937,830	263,922	3,580,208	471,723	7,914,342	63.8	4,482,068	3,728,763	3,503,073	3,651,576
Wichita Valley	Dec.	271	92,189	6,814	106,663	32,975	7,573	10	40,136	1,496	72,165	67.7	34,498	29,475	16,234	34,688
	12 mos.	271	1,305,261	100,136	1,489,517	275,212	95,155	355	475,564	19,984	862,594	57.9	626,923	537,794	284,298	388,557
Columbus & Greenville	Dec.	167	137,465	30,141	177,271	30,786	21,796	3,097	54,979	13,664	123,386	69.6	53,885	39,997	32,335	22,381
	12 mos.	167	1,599,145	218,079	1,941,195	403,262	223,086	44,085	652,458	140,914	1,459,881	75.2	481,314	400,674	265,507	133,978
Conemaugh & Black Lick	Dec.	23	56,539	.....	118,773	—7,459	17,866	999	72,206	4,069	87,681	73.8	31,092	29,621	21,683	1,455
	12 mos.	23	1,189,294	.....	2,139,242	170,345	332,690	9,267	1,135,628	41,823	1,689,753	79.0	449,489	417,018	403,746	255,659
Delaware & Hudson	Dec.	881	3,022,550	243,713	3,467,079	567,311	811,169	53,568	1,141,203	155,529	2,736,827	78.9	730,252	641,184	639,514	1,838,306
	12 mos.	881	35,172,506	3,283,705	41,365,708	5,102,071	9,528,833	679,228	14,725,447	1,962,620	32,140,508	77.7	9,225,200	8,155,129	8,164,740	7,662,966
Delaware, Lackawanna & Western	Dec.	998	4,709,052	959,402	6,453,924	501,253	1,118,324	141,585	2,660,631	179,289	4,629,187	71.7	1,824,737	1,612,378	1,616,770	1,726,636
	12 mos.	998	60,486,177	11,285,364	81,743,222	7,656,284	14,280,455	1,709,035	31,640,623	2,129,073	57,719,910	70.6	24,023,312	17,376,760	17,508,587	17,110,545
Denver & Rio Grande Western	Dec.	2,563	2,333,176	214,445	2,766,746	243,294	641,495	64,106	927,382	94,338	1,990,291	71.9	776,455	575,143	590,656	808,260
	12 mos.	2,558	28,541,532	3,439,941	34,828,669	5,441,659	6,592,013	751,492	10,236,514	1,098,634	24,535,166	70.4	10,293,503	7,893,470	8,528,676	7,094,772
Denver & Salt Lake	Dec.	232	402.058	16,544	436,354	30,470	66,952	2,300	64,282	13,291	176,831	40.5	259,523	229,032	234,759	133,589
	12 mos.	232	3,471,169	198,692	3,981,131	660,393	785,256	26,703	610,268	163,993	2,226,647	55.9	1,754,484	1,597,950	1,679,287	1,428,412
Detroit & Mackinac	Dec.	273	56,881	11,300	76,124	38,460	25,489	2,091	37,910	5,804	109,424	143.7	—33,000	—42,813	—42,226	141,947
	12 mos.	285	1,323,361	125,169	1,586,302	401,077	337,381	26,479	483,634	75,074	1,274,011	80.3	312,291	208,882	230,744	330,089
Detroit & Toledo Shore Line	Dec.	....	Not yet filed.													
	12 mos.	....	Not yet filed.													
Detroit Terminal	Dec.	19	.....	.....	97,728	16,999	14,723	.....	89,682	4,787	126,191	129.1	—28,463	—26,361	—26,329	—16,133
	12 mos.	19	.....	.....	2,436,356	263,735	224,247	1,000	1,126,116	53,386	1,667,485	68.4	768,871	558,811	565,274	563,059
Detroit, Toledo & Ironton	Dec.	524	835,129	3,307	852,449	169,947	360,862	14,755	317,499	40,266	900,240	105.6	—47,791	—13,005	—54,608	369,742
	12 mos.	499	13,721,034	37,371	14,057,420	1,898,497	2,144,025	145,550	3,516,039	390,961	8,065,030	57.4	5,992,390	5,377,963	4,501,659	2,635,599
Duluth & Iron Range	Dec.	268	56,926	5,708	80,452	71,413	121,929	1,440	70,523	24,702	289,630	360.0	—209,178	—192,589	—189,345	—271,474
	12 mos.	269	6,283,402	54,553	7,259,165	1,171,240	1,344,716	17,081	1,689,662	265,237	4,486,443	61.8	2,772,722	2,248,226	2,264,238	1,721,948
Duluth, Missabe & Northern	Dec.	305	64,791	4,520	83,826	184,250	235,023	3,350	148,657	42,607	613,660	732.1	—529,834	—357,365	—347,908	—727,623
	12 mos.	306	18,126,918	45,321	20,606,295	1,805,794	2,261,725	35,320	3,370,201	301,954	7,774,369	37.7	12,831,926	10,959,166	10,955,159	8,056,785
Duluth, Winnipeg & Pacific	Dec.	178	153,405	13,805	171,771	29,758	47,904	4,657	73,090	7,554	165,786	96.5	5,985	1,253	3,133	26,302
	12 mos.	178	2,181,849	172,480	2,484,113	504,596	538,389	57,775	866,466	98,401	2,102,706	84.6	381,407	258,867	270,674	320,634
Elgin, Joliet & Eastern	Dec.	453	1,587,402	28	1,745,306	254,402	408,478	13,882	800,316	55,706	1,532,545	87.8	212,761	178,336	—18,485	—547,205
	12 mos.	453	24,026,437	277	26,412,441	2,642,493	4,329,220	181,285	9,244,862	640,489	17,025,584	64.5	9,386,857	7,897,817	5,519,410	3,730,959
Erie	Dec.	2,046	6,639,754	897,598	8,306,046	766,915	2,073,970	191,898	3,493,544	346,083	6,912,991	83.2	1,393,055	1,190,796	1,084,163	1,617,041
	12 mos.	2,046	93,327,446	10,411,052	113,610,598	13,256,652	26,354,144	2,234,914	42,638,300	3,725,214	88,750,517	78.1	24,860,081	19,873,521	19,084,600	18,434,210
Chicago & Erie	Dec.	269	875,314	58,176	1,045,463	139,682	130,127	33,535	404,981	45,526	750,719	71.8	294,744	234,180	—92,468	7,380
	12 mos.	269	13,594,797	654,724	15,619,839	1,874,286	1,624,918	365,606	4,509,750	521,317	8,880,399	56.9	6,739,440	6,052,604	2,377,438	1,612,949
New Jersey & New York	Dec.	45	23,307	97,172	127,345	7,363	16,014	1,850	70,922	4,660	100,802	79.2	26,543	22,146	—11,288	—25,293
	12 mos.	45	318,130	1,153,418	1,542,992	212,492	248,507	22,426	824,969	46,184	1,354,524	87.8	188,383	138,769	—260,092	—248,228
N. Y., Susquehanna & Western	Dec.	131	359,033	41,586	435,891	22,618	52,191	5,411	208,614	14,152	302,890	69.5	133,001	107,626	76,450	13,139
	12 mos.	131	4,096,580	508,492	5,057,565	655,995	646,622	64,255	2,235,668	151,928	3,754,182	74.2	1,303,383	935,451	647,256	459,550

Revenues and Expenses of Railways

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1929—CONTINUED

Name of road		Av. mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net ry. operating income.	Net ry. operating income, 1928.
Evansville, Indianap. & Terre Haute	Dec.	145	$171,537	$3,345	$181,785	$14,691	$22,234	$1,723	$71,800	$5,068	$115,527	63.6	$66,258	$56,521	$9,679	$21,980
	12 mos.	145	1,816,965	39,294	1,945,131	305,266	239,851	22,763	691,590	59,105	1,318,295	67.8	626,836	561,507	155,741	—495
Florida East Coast	Dec.	863	712,153	300,632	1,276,127	291,227	261,299	34,851	372,279	34,906	971,880	76.2	304,247	291,872	234,405	181,127
	12 mos.	854	7,527,671	4,036,665	13,446,015	2,247,164	2,262,521	349,303	3,836,966	554,276	9,437,666	70.2	4,008,349	2,401,336	1,637,961	1,426,619
Fort Smith & Western	Dec.	249	121,845	9,344	139,053	23,581	25,662	5,983	45,248	6,973	106,827	76.8	32,226	26,569	19,169	21,063
	12 mos.	249	1,314,154	108,235	1,528,874	296,927	304,546	70,451	494,028	85,173	1,243,370	81.3	285,504	226,643	121,031	67,034
Galveston Wharf	Dec.	13	.....	.....	252,593	145,330	6,759	6,749	27,231	11,876	217,482	86.1	35,111	—1,118	—325	55,032
	12 mos.	13	.....	.....	2,390,022	621,003	62,658	54,842	406,579	84,243	1,448,759	60.6	941,263	605,834	608,617	763,997
Georgia R. R.	Dec.	328	303,359	64,474	408,282	39,190	89,366	22,033	177,308	24,337	351,867	86.2	56,415	48,243	78,724	68,536
	12 mos.	328	4,212,500	652,871	5,281,218	631,931	1,006,038	270,013	2,203,612	284,201	4,395,706	83.2	885,512	757,930	939,866	912,938
Georgia & Florida	Dec.	502	85,313	9,561	103,496	24,623	20,241	8,867	55,925	6,992	116,346	112.4	—12,850	—21,087	—18,203	—19,453
	12 mos.	498	1,454,232	110,240	1,673,596	316,880	264,117	116,133	681,330	102,465	1,471,705	87.9	201,891	87,027	113,955	146,664
Grand Trunk Western	Dec.	....	Not yet filed.													
	12 mos.	....	Not yet filed.													
Atlantic & St. Lawrence	Dec.	166	118,953	24,119	162,998	35,000	38,500	5,500	96,000	8,500	185,159	113.6	—22,152	—34,712	—84,645	—49,148
	12 mos.	166	1,742,293	295,709	2,285,798	581,771	533,827	71,772	1,182,684	102,168	2,491,683	109.0	—205,885	—383,765	—996,008	—988,353
Chicago, Det. & Canada Gr. Tr. Jct.	Dec.	....	Not yet filed.													
	12 mos.	....	Not yet filed.													
Detroit, Grand Haven & Mil.	Dec.	....	Not yet filed.													
	12 mos.	....	Not yet filed.													
Great Northern	Dec.	8,367	5,438,676	1,010,378	7,407,271	Cr. 612,153	1,537,003	253,857	3,049,075	251,500	4,551,160	61.4	2,856,111	2,015,320	1,950,135	946,547
	12 mos.	8,367	101,178,779	11,298,352	125,932,808	17,073,972	20,278,320	3,127,846	38,351,284	2,784,428	82,862,910	65.8	43,069,898	33,851,563	32,457,523	31,294,069
Green Bay & Western	Dec.	....	Not yet filed.													
	12 mos.	....	Not yet filed.													
Gulf & Ship Island	Dec.	307	169,182	40,352	231,490	68,758	53,832	4,749	90,793	11,661	232,577	100.5	—1,087	—19,754	—32,817	—45,013
	12 mos.	307	2,483,143	423,698	3,177,916	744,060	584,612	60,795	1,191,617	96,388	2,714,968	85.4	462,948	86,541	—93,006	—70,194
Gulf, Mobile & Northern	Dec.	733	459,994	39,925	541,054	54,100	85,078	32,709	196,919	37,857	410,000	75.78	131,054	112,472	77,564	106,299
	12 mos.	733	6,918,235	335,481	7,631,220	1,065,941	1,148,445	395,437	2,267,447	358,949	5,240,212	68.67	2,391,008	1,876,395	1,429,948	1,300,332
Hocking Valley	Dec.	348	1,295,801	56,274	1,450,381	163,005	320,830	19,136	363,785	46,561	913,041	63.0	537,340	449,143	500,752	448,689
	12 mos.	348	18,226,408	648,612	20,888,860	2,506,365	3,848,878	203,127	5,509,792	551,611	12,602,729	60.3	8,286,131	6,793,262	6,035,440	5,624,746
Illinois Central	Dec.	5,018	8,830,407	1,944,708	11,720,635	1,330,138	2,528,188	296,108	4,433,329	357,142	8,976,811	76.6	2,743,824	2,132,663	2,180,282	2,430,434
	12 mos.	5,027	120,543,326	20,711,253	153,183,808	19,100,798	35,965,886	3,168,909	54,147,781	4,350,891	117,832,623	76.9	35,351,185	24,824,539	24,447,078	25,761,834
Yazoo & Mississippi Valley	Dec.	1,705	1,778,143	367,719	2,311,111	310,434	356,816	44,643	864,078	66,005	1,637,059	70.8	674,052	541,287	470,833	477,155
	12 mos.	1,705	22,505,135	3,317,028	27,585,565	4,663,480	5,130,835	526,696	10,253,937	785,527	21,421,964	77.7	6,163,601	4,198,311	3,274,932	3,175,465
Illinois Central System	Dec.	6,724	10,619,541	2,317,960	14,048,271	1,640,572	2,888,958	340,751	5,307,436	423,257	10,627,963	75.7	3,420,308	2,676,382	2,653,547	2,907,694
	12 mos.	6,732	143,206,954	24,076,582	180,976,182	23,764,278	41,160,186	3,695,605	64,512,117	5,138,038	139,430,071	77.0	41,546,111	29,044,099	27,743,259	28,917,199
Illinois Terminal	Dec.	481	418,409	140,985	586,313	44,773	57,350	16,715	211,429	36,980	363,381	61.98	222,932	193,670	145,491	—97,428
	12 mos.	475	5,314,255	1,533,221	7,163,425	970,541	998,199	223,020	2,400,805	438,052	5,015,064	70.01	2,148,361	1,884,156	1,384,966	868,179
Kansas City Southern	Dec.	784	1,125,822	98,646	1,398,500	144,223	254,989	70,281	471,534	88,028	1,033,369	73.9	365,131	343,202	288,225	434,117
	12 mos.	784	15,686,303	1,060,105	18,876,072	2,276,763	3,156,890	761,443	5,474,795	1,030,940	12,723,773	67.4	6,152,299	4,875,897	4,165,885	4,151,476
Texarkana & Ft. Smith	Dec.	99	181,839	7,565	230,576	31,508	24,114	9,447	58,944	13,615	140,333	60.9	90,243	94,917	77,423	—4,242
	12 mos.	99	2,742,659	83,872	3,102,150	318,716	276,359	91,572	704,540	135,532	1,551,642	50.0	1,550,508	1,368,646	983,036	822,092
Kansas, Oklahoma & Gulf	Dec.	326	282,169	2,788	292,301	2,918	30,213	16,087	72,983	15,137	134,566	46.0	157,735	137,869	110,392	85,774
	12 mos.	326	3,586,099	31,058	3,698,842	412,715	346,819	179,922	815,178	134,276	1,861,499	50.3	1,837,343	1,581,347	1,297,773	917,834
Lake Superior & Ishpeming	Dec.	160	47,100	1,517	52,979	36,877	37,513	1,584	36,776	15,841	128,335	242.2	—75,356	—75,770	—78,997	—52,780
	12 mos.	160	2,691,484	12,214	3,130,099	465,107	340,560	7,327	654,167	95,424	1,562,139	49.9	1,567,960	1,261,163	1,219,738	752,529
Lake Terminal	Dec.	12	.....	.....	54,857	8,234	12,876	.....	36,846	2,844	60,800	110.8	—5,943	—4,625	—8,378	—3,355
	12 mos.	12	.....	.....	1,208,234	155,887	173,252	.....	611,856	26,306	967,301	80.1	240,933	168,052	179,990	44,131
Lehigh & Hudson River	Dec.	96	201,675	970	217,994	18,973	32,805	2,833	77,644	13,187	145,436	66.7	72,558	57,514	38,338	32,973
	12 mos.	96	2,495,088	14,338	2,649,345	336,503	394,977	31,896	893,133	121,204	1,777,707	67.1	871,638	693,600	477,609	522,024
Lehigh & New England	Dec.	216	396,008	968	402,241	49,436	93,496	5,729	145,283	17,031	310,947	77.3	91,294	182,907	183,474	96,708
	12 mos.	216	4,991,945	11,567	5,084,659	614,758	1,120,624	70,749	1,765,097	200,268	3,770,366	74.2	1,314,293	1,241,817	1,183,176	1,211,313
Lehigh Valley	Dec.	1,361	4,590,112	572,348	5,576,358	408,848	1,155,377	136,053	2,435,658	141,195	4,306,752	77.2	1,269,606	1,128,255	993,567	713,044
	12 mos.	1,361	59,359,407	6,506,173	71,722,735	6,110,456	15,014,838	1,718,254	28,501,635	1,773,974	53,501,134	74.6	18,221,601	14,523,162	12,938,556	12,315,126
Louisiana & Arkansas	Dec.	636	520,833	25,885	580,699	63,040	108,183	20,221	208,499	26,513	426,776	73.5	153,923	147,387	85,878	93,966
	12 mos.	636	7,261,469	275,111	7,866,665	1,254,022	1,213,565	269,461	2,323,039	283,109	5,314,428	67.6	2,552,237	1,943,530	1,343,838	1,034,737
Louisiana Ry. & Nav. Co. of Texas	Dec.	206	77,197	3,196	84,399	21,862	9,843	4,680	34,000	3,943	74,273	88.0	10,126	5,104	—6,462	12,339
	12 mos.	206	994,600	33,570	1,079,722	296,071	165,357	38,885	457,957	65,005	1,021,415	94.6	58,307	—13,528	—169,294	—135,741
Louisville & Nashville	Dec.	5,250	8,467,443	1,381,242	10,706,077	1,412,610	2,486,210	294,990	3,324,468	362,066	7,938,875	74.2	2,767,202	2,110,345	2,176,626	1,989,933
	12 mos.	5,249	108,614,413	15,656,189	133,328,453	21,348,714	30,649,421	2,997,497	45,550,233	4,546,533	105,672,237	79.3	27,656,216	20,019,842	20,874,750	22,587,254

Revenues and Expenses of Railways

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1929—CONTINUED

Name of road		Av. mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net ry. operating income.	Net ry. operating income, 1928.
Maine Central	Dec.	1,121	$1,214,803	$276,926	$1,647,866	$195,551	$293,636	$14,513	$667,776	$51,881	$1,224,429	74.3	$423,437	$335,181	$292,251	$197,630
	12 mos.	1,122	14,766,025	3,121,949	20,312,269	2,848,567	3,951,150	212,712	7,410,227	621,059	15,067,261	74.2	5,245,008	4,116,659	3,680,319	2,704,328
Midland Valley	Dec.	363	252,743	9,112	272,793	27,722	32,742	9,681	75,808	13,948	149,311	54.7	123,482	106,250	85,693	6,390
	12 mos.	363	3,314,161	136,390	3,581,686	623,716	367,992	75,807	901,044	138,982	2,070,164	57.8	1,511,522	1,320,745	1,052,904	1,023,981
Minneapolis & St. Louis	Dec.	1,627	959,838	71,080	1,099,719	95,585	237,398	39,175	535,068	51,504	957,605	87.1	142,114	74,719	33,034	4,178
	12 mos.	1,627	12,912,562	805,854	14,700,506	1,872,555	2,507,996	436,064	6,456,810	560,369	11,831,007	80.5	2,869,499	2,075,426	1,867,016	522,277
Minn., St. Paul & S. S. Marie	Dec.	4,411	2,679,305	348,440	3,313,631	528,684	627,248	85,633	1,325,345	125,252	2,685,047	81.0	628,584	487,168	327,630	558,939
	12 mos.	4,383	39,751,819	4,633,493	48,653,651	6,579,169	8,802,553	982,058	17,262,038	1,474,309	35,321,218	72.6	13,332,433	10,487,393	8,589,182	9,006,174
Duluth, South Shore & Atlantic	Dec.	573	240,676	50,534	342,391	39,710	70,089	7,203	152,747	10,621	282,536	82.5	59,855	29,016	5,777	7,042
	12 mos.	573	3,883,333	619,370	4,971,501	860,249	840,595	91,356	2,038,940	130,637	3,988,822	80.2	982,679	606,496	412,569	327,475
Spokane International	Dec.	165	56,689	9,679	80,479	12,860	3,857	3,865	29,163	7,540	58,085	72.2	22,394	18,068	12,753	20,034
	12 mos.	165	957,078	104,959	1,243,838	215,601	107,698	44,417	396,149	82,751	858,988	69.1	384,850	322,962	243,862	240,326
Mississippi Central	Dec.	150	106,118	7,821	119,685	9,818	28,078	10,383	36,808	8,632	93,288	77.9	26,397	26,787	29,854	28,268
	12 mos.	155	1,498,023	79,420	1,644,922	221,781	314,783	116,430	431,915	99,930	1,184,062	72.0	460,860	348,889	377,384	386,057
Missouri & North Arkansas	Dec.	364	113,239	10,162	133,131	32,382	27,017	9,436	64,350	8,571	142,446	106.9	—9,315	—11,813	—24,707	—6,822
	12 mos.	364	1,677,993	119,840	1,933,824	448,630	323,600	117,498	726,365	104,836	1,724,226	89.2	209,598	178,862	11,408	—27,657
Missouri-Illinois	Dec.	202	152,161	2,565	158,040	27,658	85,388	3,068	51,185	7,820	175,084	110.8	—17,044	—22,978	—28,708	18,030
	12 mos.	202	2,237,068	21,043	2,324,095	319,896	454,799	41,791	637,443	97,773	1,549,245	66.7	774,850	636,349	512,755	440,643
Missouri-Kansas-Texas Lines	Dec.	3,188	3,342,504	513,035	4,296,148	341,103	565,634	127,518	1,293,750	172,213	2,523,155	58.7	1,772,993	1,562,525	1,307,723	1,099,154
	12 mos.	3,188	44,619,990	6,206,420	56,024,439	7,708,904	9,854,928	1,516,157	16,149,710	2,062,332	37,456,339	66.9	18,568,100	15,261,129	12,566,092	12,204,471
Missouri Pacific	Dec.	7,452	8,117,309	1,061,322	10,112,736	1,518,686	2,017,230	374,891	3,863,086	392,592	8,025,465	79.4	2,087,271	1,686,635	1,376,307	1,559,044
	12 mos.	7,458	114,345,150	13,023,293	139,807,914	24,297,017	23,057,776	3,924,527	46,863,222	4,700,990	102,903,441	73.6	36,904,473	30,615,599	24,554,185	21,347,536
Gulf Coast Lines	Dec.	1,026	1,009,861	151,129	1,255,007	154,586	156,979	45,903	423,567	64,923	848,800	67.63	406,206	355,239	293,368	256,034
	12 mos.	1,026	12,677,454	1,546,307	15,236,466	2,419,791	2,555,361	552,460	4,395,425	739,518	10,615,759	69.67	4,620,706	3,958,167	3,156,096	2,943,821
International Great Northern	Dec.	1,159	1,001,615	202,370	1,385,868	217,254	187,781	47,366	571,258	70,353	1,104,429	79.69	281,439	232,048	140,034	127,916
	12 mos.	1,159	14,158,825	2,074,571	18,244,984	2,854,835	2,947,439	496,049	7,089,750	856,741	14,249,272	78.10	3,995,712	3,474,143	2,266,945	2,627,076
San Antonio, Uvalde & Gulf	Dec.	318	106,525	15,830	135,651	29,119	10,257	7,747	44,517	8,855	97,962	72.2	37,689	34,191	8,136	—28,366
	12 mos.	318	1,540,607	197,670	1,904,993	448,390	275,112	89,487	578,960	103,817	1,484,534	77.9	420,459	368,911	27,114	169,341
Mobile & Ohio	Dec.	1,159	965,031	99,360	1,146,628	181,325	241,110	60,896	476,234	52,630	1,005,773	87.7	140,855	67,460	23,749	251,888
	12 mos.	1,159	15,226,491	1,051,981	17,315,532	2,590,439	3,260,903	682,879	6,158,894	609,530	13,269,311	76.6	4,046,221	3,020,459	2,460,151	2,647,695
Monongahela	Dec.	170	548,699	9,048	562,892	51,044	68,487	1,394	154,775	10,586	285,800	50.8	277,092	261,154	147,534	152,212
	12 mos.	171	7,239,190	116,843	7,424,672	931,044	893,487	14,372	1,857,804	133,772	3,822,160	51.5	3,602,512	3,318,386	2,060,804	1,942,474
Monongahela Connecting	Dec.	6	.....	.....	158,058	7,784	30,006	300	76,707	4,727	119,524	75.6	38,534	33,166	25,468	42,751
	12 mos.	6	.....	.....	2,568,634	272,234	415,577	3,601	1,101,647	45,534	1,838,593	71.6	730,041	601,580	502,924	414,549
Montour	Dec.	56	181,318	.....	181,485	29,726	49,193	1,027	55,484	7,375	138,081	76.1	43,404	40,554	49,292	23,572
	12 mos.	56	2,427,281	10	2,436,498	341,030	601,095	15,811	577,991	87,687	1,613,913	66.2	822,585	799,733	914,990	646,813
Nashville, Chatt. & St. Louis	Dec.	1,222	1,181,508	233,729	1,612,445	779,278	363,448	77,578	660,501	84,313	1,374,892	85.3	237,553	162,419	181,753	79,447
	12 mos.	1,235	18,180,107	2,909,440	23,203,724	2,717,426	4,649,291	951,935	8,031,216	965,914	17,397,378	75.0	5,806,346	4,724,288	4,845,801	4,232,896
Nevada Northern	Dec.	165	75,624	3,875	92,999	10,782	3,822	1,074	17,012	5,734	38,612	41.5	54,387	41,763	40,616	56,852
	12 mos.	165	1,093,668	68,319	1,324,630	147,029	74,759	11,634	203,615	60,920	500,093	37.7	824,537	650,925	631,953	482,648
Newburgh & South Shore	Dec.	6	.....	.....	89,426	44,772	37,105	.....	45,790	13,010	140,677	157.3	—51,251	—55,411	—49,795	97,797
	12 mos.	6	.....	.....	1,957,313	218,789	388,223	.....	792,012	80,703	1,479,727	75.6	477,586	290,214	345,137	444,824
New Orleans Great Northern	Dec.	....	Not yet filed.													
	12 mos.	....	Not yet filed.													
New Orleans Terminal	Dec.	20	1,367	.....	147,540	22,388	8,356	.....	53,938	2,068	86,750	58.8	60,790	49,048	44,509	12,636
	12 mos.	20	25,821	.....	1,806,399	225,537	110,680	.....	705,064	20,846	1,062,119	58.8	744,280	615,547	483,029	481,102
New York Central	Dec.	6,914	17,183,245	8,581,407	30,517,090	4,152,871	7,549,361	512,116	11,871,520	1,034,550	25,685,316	84.2	4,831,774	3,372,742	3,241,111	4,340,306
	12 mos.	6,914	242,331,920	97,105,362	396,927,577	53,188,331	88,740,866	5,841,244	137,264,546	11,213,654	302,548,530	76.2	94,379,047	66,677,590	64,727,749	62,222,122
Cincinnati Northern	Dec.	244	338,267	3,054	349,669	20,983	47,584	6,206	106,494	9,806	194,163	55.5	155,506	141,145	138,560	93,055
	12 mos.	244	3,700,573	36,855	3,840,769	406,890	751,538	71,951	1,235,891	121,407	2,590,171	67.4	1,250,598	963,191	883,240	670,291
Cleve., Cinn., Chicago & St. Louis	Dec.	2,398	5,053,216	1,246,399	7,008,642	748,848	1,333,845	165,939	2,910,491	242,987	5,475,758	78.1	1,532,884	1,225,679	1,064,476	2,442,006
	12 mos.	2,398	69,578,700	13,996,276	91,981,900	10,283,850	20,093,486	1,909,128	33,466,817	2,872,360	69,624,283	75.7	22,357,617	16,997,050	15,919,436	15,622,538
Indiana Harbor Belt	Dec.	117	.....	.....	983,560	65,406	113,046	5,527	466,741	26,579	688,427	70.0	295,133	284,272	193,968	252,836
	12 mos.	118	.....	.....	12,967,446	1,132,406	1,342,411	61,182	5,095,518	327,497	8,105,830	62.5	4,861,616	4,078,525	3,406,467	3,361,144
Michigan Central	Dec.	1,858	4,102,610	1,750,653	6,618,346	677,112	1,321,343	138,308	2,413,677	179,284	4,868,898	73.6	1,749,448	1,332,444	1,171,391	1,929,306
	12 mos.	1,858	64,484,363	19,883,090	94,718,967	10,060,359	19,798,575	1,657,292	29,916,401	2,092,332	64,865,395	68.5	29,853,572	23,445,484	21,898,377	23,155,967
Pittsburgh & Lake Erie	Dec.	231	2,010,132	198,973	2,304,292	270,070	824,192	31,722	836,471	79,745	2,054,012	89.1	250,280	114,327	432,066	728,517
	12 mos.	231	30,533,377	2,238,864	34,135,108	4,063,519	11,924,609	354,222	10,978,383	951,126	28,396,026	83.2	5,739,082	3,621,584	7,891,540	7,770,829
New York, Chicago & St. Louis	Dec.	1,690	3,451,849	188,626	3,803,658	442,319	722,409	114,381	1,626,276	141,485	3,026,508	79.6	777,150	560,091	278,936	960,537
	12 mos.	1,690	52,250,805	1,983,430	56,385,456	7,015,494	10,688,774	1,355,865	19,466,457	1,596,024	39,896,885	70.8	16,488,571	13,428,146	10,471,999	9,556,897

Revenues and Expenses of Railways

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1929—CONTINUED

Name of road		Av. mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net ry. operating income.	Net ry. operating income, 1928.
N. Y., New Haven & Hartford	Dec.	2,133	$5,533,903	$4,169,032	$11,678,950	$1,292,985	$1,981,045	$111,223	$3,702,001	$335,205	$7,640,714	65.4	$4,038,236	$3,550,574	$2,973,268	$2,802,996
	12 mos.	2,131	77,914,074	46,842,159	142,458,670	20,017,176	23,382,074	1,284,307	43,310,452	3,990,206	94,118,545	66.1	48,340,125	40,239,295	33,631,144	29,238,404
New York Connecting	Dec.	20	208,729	.....	238,005	14,660	12,975	.....	39,870	2,113	69,618	29.3	168,387	132,699	113,694	88,097
	12 mos.	20	2,630,463	.....	3,041,033	435,468	146,686	.....	454,592	21,423	1,058,169	34.8	1,982,864	1,544,076	1,260,858	1,068,920
New York, Ontario & Western	Dec.	568	686,578	59,494	880,351	101,515	210,461	14,300	451,359	34,413	821,352	93.3	58,999	35,810	—14,598	—43,916
	12 mos.	568	8,375,888	1,902,210	12,212,597	1,762,880	2,389,025	230,549	5,363,612	412,196	10,202,328	83.5	2,010,269	1,521,717	851,365	913,577
Norfolk & Western	Dec.	2,240	8,637,526	479,064	9,555,066	1,446,558	1,634,411	128,903	1,958,581	251,873	5,423,824	56.8	4,131,242	3,305,643	3,541,856	3,284,637
	12 mos.	2,240	108,351,498	5,110,928	117,631,751	14,838,067	20,848,612	1,442,059	25,897,415	2,917,445	66,051,247	56.2	51,580,504	41,246,346	44,208,196	34,204,058
Norfolk Southern	Dec.	931	460,930	32,939	548,821	82,444	89,408	28,038	204,913	28,349	432,949	78.9	115,872	63,157	53,053	73,314
	12 mos.	931	7,086,575	398,866	8,108,287	1,141,489	1,172,148	332,160	3,041,707	342,474	6,004,875	74.1	2,103,412	1,484,383	1,291,973	1,545,608
Northern Pacific	Dec.	6,783	5,051,789	831,819	6,708,027	637,043	1,645,089	188,366	2,587,447	278,670	5,446,545	81.2	1,261,482	583,912	1,026,937	1,880,443
	12 mos.	6,789	76,862,142	9,820,918	96,522,348	12,203,551	18,755,105	2,702,015	32,342,737	3,127,989	70,551,665	73.1	25,970,683	16,739,006	21,410,344	25,088,572
Northwestern Pacific	Dec.	476	222,147	125,943	394,207	96,605	111,329	7,546	212,231	17,000	444,614	112.8	—50,407	—87,763	—90,759	—151,386
	12 mos.	477	3,872,736	1,700,474	6,186,763	1,255,817	1,070,325	91,847	2,759,332	214,072	5,384,887	87.0	801,876	351,993	299,726	50,483
Pennsylvania R. R.	Dec.	10,515	32,641,475	11,253,709	49,562,676	6,994,810	10,691,983	991,224	19,572,011	1,834,122	40,585,930	81.9	8,976,746	6,564,608	5,164,901	8,041,203
	12 mos.	10,515	482,896,402	129,583,665	682,702,931	87,847,375	131,642,781	11,054,411	235,190,936	19,826,177	493,150,592	72.2	189,552,339	148,945,017	133,139,626	117,297,686
Long Island	Dec.	404	806,020	2,094,368	3,110,284	515,347	407,643	16,376	1,406,691	64,781	2,410,946	77.5	699,338	557,998	418,569	422,613
	12 mos.	404	11,216,368	27,782,481	41,326,194	5,227,146	5,609,941	250,007	15,869,018	768,247	27,734,679	67.1	13,591,515	10,649,328	8,707,943	7,542,458
West Jersey & Seashore	Dec.	369	388,765	214,465	637,576	61,584	114,529	3,947	348,151	14,847	545,117	85.5	92,459	92,459	120,487	82,468
	12 mos.	369	5,224,294	4,696,095	10,435,800	1,409,851	1,355,259	66,597	4,216,016	201,615	7,274,769	69.7	3,161,031	2,123,654	1,878,200	970,615
Peoria & Pekin Union	Dec.	19	16,462	1,927	150,237	15,593	9,597	5,239	83,277	4,795	118,501	78.9	31,736	18,491	33,140	—6,609
	12 mos.	19	232,173	19,169	1,825,888	229,291	156,664	65,760	794,835	96,466	1,343,016	73.6	482,872	297,523	499,145	543,136
Pere Marquette	Dec.	2,241	2,752,823	270,135	3,228,643	374,451	1,130,605	86,204	1,268,359	146,454	2,995,310	92.8	233,333	63,873	—129,167	607,896
	12 mos.	2,241	42,173,263	3,001,677	48,468,439	5,614,108	10,534,758	825,244	15,916,795	1,519,429	34,345,301	70.9	14,123,138	11,150,409	9,273,417	10,596,357
Pittsburgh & Shawmut	Dec.	102	117,989	4,173	126,524	17,037	35,367	1,943	37,074	6,732	98,153	77.6	28,371	27,037	28,224	39,625
	12 mos.	102	1,441,363	39,349	1,511,030	234,388	396,982	21,377	445,700	93,912	1,192,359	78.9	318,671	302,568	356,865	516,712
Pittsburgh & West Virginia	Dec.	92	239,591	4,201	272,871	34,280	70,736	22,122	61,462	21,619	219,486	80.4	53,385	41,171	94,105	140,738
	12 mos.	92	4,300,661	48,845	4,729,605	456,729	985,527	216,666	853,557	293,722	2,929,924	61.9	1,799,681	1,331,585	2,276,784	2,218,716
Pittsburgh, Shawmut & Northern	Dec.	198	137,361	1,243	142,367	26,099	289,949	1,765	51,122	7,092	376,027	264.1	—233,660	—234,797	—239,509	—1,240
	12 mos.	198	1,732,339	14,518	1,798,767	394,918	589,716	20,017	573,396	76,930	1,654,977	92.0	143,790	109,680	12,246	285,656
Quincy, Omaha & Kansas City	Dec.	249	39,420	9,210	57,377	39,986	13,118	859	31,549	2,178	87,250	152.1	—29,875	—32,510	—35,038	—3,842
	12 mos.	249	589,526	105,195	780,486	341,133	109,897	9,439	337,499	31,737	827,390	106.0	—46,904	—103,135	—135,471	—197,073
Reading	Dec.	1,459	6,942,081	648,692	8,032,204	1,107,755	1,807,766	117,895	3,090,173	231,974	6,382,850	79.5	1,649,354	1,378,368	1,368,073	1,802,852
	12 mos.	1,459	83,488,623	7,080,682	97,196,955	14,097,108	22,000,823	1,144,656	35,698,864	2,652,633	75,929,796	78.1	21,267,159	16,824,310	17,196,521	17,736,926
Atlantic City	Dec.	163	134,252	67,997	222,849	69,521	17,916	3,356	137,945	8,836	237,734	106.7	—14,885	—55,757	—66,752	—125,944
	12 mos.	163	1,609,770	2,073,621	3,988,454	797,125	267,623	51,317	2,175,691	60,187	3,353,831	84.1	634,623	152,035	—130,242	—721,387
Richmond, Fredericksburg & Potomac	Dec.	117	454,502	349,287	1,058,756	95,379	184,271	9,837	306,038	33,883	647,802	61.2	410,954	371,188	299,365	329,624
	12 mos.	117	5,998,975	3,673,230	11,843,825	1,447,404	2,011,755	119,030	3,890,765	436,612	8,142,466	68.7	3,701,359	3,019,548	2,434,944	2,011,879
Rutland	Dec.	413	235,352	82,707	466,463	94,875	100,867	11,837	192,368	19,701	421,392	90.3	45,071	23,954	33,132	51,542
	12 mos.	413	3,531,144	1,024,542	6,276,682	1,164,390	1,185,231	131,465	2,330,405	205,026	5,035,512	80.2	1,241,170	903,317	997,011	940,883
St. Louis-San Francisco	Dec.	5,303	4,604,222	953,931	6,117,921	700,740	1,196,974	141,259	2,298,592	234,385	4,538,014	74.2	1,579,907	1,244,743	1,259,096	1,842,029
	12 mos.	5,304	66,955,508	10,657,451	84,938,060	11,307,273	16,640,561	1,599,004	27,712,773	2,819,874	59,439,855	70.0	25,498,205	20,421,918	20,856,637	20,646,642
Ft. Worth & Rio Grande	Dec.	233	67,127	6,246	82,148	22,111	16,117	3,657	49,455	6,589	97,443	118.6	—15,295	—22,366	—31,101	11,993
	12 mos.	233	992,347	83,994	1,234,598	397,579	215,629	41,177	535,699	64,320	1,252,556	101.5	—17,958	—73,274	—181,085	—18,855
St. Louis-San Francisco & Texas	Dec.	154	159,712	10,991	176,636	33,742	23,852	6,107	52,713	10,978	126,076	71.4	50,560	45,436	17,801	21,527
	12 mos.	154	1,783,166	133,623	2,011,316	365,222	312,721	66,463	679,819	96,950	1,518,338	75.5	492,978	454,812	125,400	79,127
St. Louis Southwestern	Dec.	1,002	1,107,249	70,346	1,263,877	173,140	194,477	77,960	395,491	65,890	913,121	72.2	350,756	332,242	221,990	343,163
	12 mos.	947	16,480,421	756,425	18,224,597	2,117,390	2,652,629	860,853	4,671,746	787,251	11,197,769	61.4	7,026,828	6,218,512	4,741,480	4,230,282
St. Louis Southwestern of Texas	Dec.	807	451,733	40,095	553,470	115,092	128,420	30,608	310,050	37,886	633,539	114.5	—80,069	—122,839	—87,861	—37,954
	12 mos.	807	6,435,531	446,545	7,704,968	3,060,268	1,564,960	357,827	3,395,117	425,206	8,917,000	115.7	—1,212,032	—1,561,408	—1,235,074	—186,864
San Diego & Arizona	Dec.	156	67,642	15,424	92,854	21,598	18,435	3,908	24,752	9,026	79,059	85.1	13,795	8,306	9,494	15,755
	12 mos.	156	1,020,966	195,679	1,275,250	232,533	217,786	48,008	326,346	104,807	945,773	74.2	329,477	261,819	265,050	223,175
Seaboard Air Line	Dec.	4,490	3,453,893	771,806	4,759,693	557,952	823,553	185,677	1,624,167	189,804	3,319,843	69.7	1,439,850	1,165,623	1,069,322	1,007,516
	12 mos.	4,490	44,707,056	7,239,320	58,151,908	7,272,643	10,224,458	2,382,759	20,161,359	2,143,916	42,587,557	73.2	15,564,351	11,830,410	10,965,725	10,055,417
Southern Ry.	Dec.	6,730	7,870,833	2,015,088	10,886,252	1,374,622	2,352,400	233,306	3,673,392	374,943	8,088,979	74.3	2,797,273	2,214,914	2,073,072	2,962,588
	12 mos.	6,730	107,962,042	22,004,662	143,183,948	21,181,962	26,535,731	2,900,575	46,642,097	4,564,332	102,701,588	71.7	40,482,360	31,133,117	30,030,977	30,842,555
Alabama Great Southern	Dec.	314	533,109	145,297	737,923	54,114	178,200	17,599	223,932	23,679	503,799	68.3	234,124	188,790	209,507	320,151
	12 mos.	314	7,905,373	1,600,221	10,336,630	1,700,640	2,097,806	253,716	2,913,024	296,943	7,342,308	71.0	2,994,322	2,215,369	2,468,709	2,538,423
Cinn., New Orleans & Texas Pac	Dec.	338	1,153,011	257,633	1,526,182	69,730	388,150	32,287	485,865	53,003	1,034,315	67.8	491,867	404,922	405,289	339,760
	12 mos.	338	18,053,597	2,958,708	22,489,448	4,570,624	5,097,934	517,186	6,262,596	654,135	17,226,977	76.6	5,262,471	4,146,565	3,995,695	4,917,528

Revenues and Expenses of Railways

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1929—CONTINUED

Name of road		Av. mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net ry. operating income.	Net ry. operating income, 1928.
Georgia Southern & Florida	Dec.	397	$193,676	$93,177	$323,041	$57,545	$77,161	$1,517	$132,693	$3,568	$278,161	86.1	$44,880	$23,007	$26,717	$151,114
	12 mos.	397	2,740,661	1,037,760	4,226,395	865,874	996,907	39,765	1,568,522	53,846	3,590,317	84.9	636,078	355,652	427,624	435,950
New Orleans & Northeastern	Dec.	204	308,250	66,749	405,748	58,469	53,432	8,867	125,386	15,317	265,042	65.3	140,706	96,848	57,027	106,037
	12 mos.	204	4,385,383	753,284	5,599,681	752,734	960,718	136,950	1,594,098	180,806	3,671,446	65.6	1,928,235	1,350,253	881,245	852,117
Northern Alabama	Dec.	110	100,803	7,619	111,418	25,383	3,677	1,814	31,918	2,879	65,674	58.9	45.744	40,148	30,303	—9,191
	12 mos.	110	1,137,725	66,277	1,251,704	273,438	41,670	24,135	368,444	33,515	741,255	59.2	510,449	432,392	213,269	56,145
Southern Pacific	Dec.	9,130	11,001,071	3,275,105	16,161,708	2,075,482	2,821,481	407,646	5,745,021	709,255	12,085,110	74.8	4,076,598	3,241,364	2,862,391	2,964,166
	12 mos.	8,961	164,624,940	39,215,281	225,677,737	27,530,535	36,139,175	5,047,128	72,468,814	8,080,720	153,351,563	68.0	72,326,174	54,229,214	48,495,250	44,956,293
So. Pacific Steamship Lines	Dec.	....	622,899	28,678	700,958	21,173	341,271	26,332	530,496	35,086	954,358	136.2	—253,400	—254,735	—254,351	—52,496
	12 mos.	....	9,212,140	637,342	10,963,437	260,515	3,686,466	251,983	6,823,679	419,405	11,442,048	104.4	—478,611	—497,027	—471,247	714,574
Texas & New Orleans	Dec.	4,729	4,097,017	907,078	5,574,668	1,049,448	1,258,503	174,498	1,879,264	260,245	4,640,987	83.3	933,681	752,002	475,136	525,710
	12 mos.	4,729	57,729,558	10,333,293	74,327,964	11,480,231	14,456,232	2,132,449	23,586,633	3,121,084	54,904,791	73.9	19,423,173	15,203,680	11,696,691	8,826,867
Spokane, Portland & Seattle	Dec.	554	508,898	87,694	650,586	114,575	114,400	12,924	216,843	27,028	492,184	75.7	158,402	63,296	37,911	151,171
	12 mos.	554	7,458,430	1,062,255	9,395,261	1,338,722	1,262,934	150,617	2,783,516	292,981	5,900,548	62.8	3,494,713	2,441,688	2,236,906	2,299,251
Tennessee Central	Dec.	296	192,141	14,135	221,225	46,238	40,185	9,321	90,473	14,000	195,817	88.5	25,408	21,979	6,414	29,456
	12 mos.	296	2,937,900	185,932	3,330,262	592,339	517,644	104,844	1,167,139	161,754	2,514,783	75.5	815,479	719,729	495,773	392,711
Terminal R. R. Assn. of St. Louis	Dec.	55	.....	.....	843,970	252,837	99,101	2,992	441,131	30,076	829,707	98.3	14,263	—31,155	55,057	218,356
	12 mos.	55	.....	.....	12,531,589	2,072,332	1,055,794	32,792	5,509,906	330,611	9,040,177	72.1	3,491,412	2,302,051	3,363,026	3,710,658
Texas & Pacific	Dec.	1,954	2,651,980	499,609	3,490,885	647,301	647,821	95,112	1,184,486	118,030	2,675,416	76.6	815,469	622,659	455,984	886,225
	12 mos.	1,994	36,829,630	5,442,679	45,696,434	7,395,147	7,801,173	1,086,196	14,144,602	1,484,020	31,849,721	69.7	13,846,713	11,586,256	8,778,383	10,446,475
Texas Mexican	Dec.	162	84,357	3,303	66,936	16,016	20,497	4,211	7,696	7,914	55,050	82.2	11,886	6,236	4,749	20,802
	12 mos.	162	1,179,502	42,913	1,333,541	231,579	232,351	49,602	477,978	94,357	1,073,556	80.5	259,985	198,842	106,768	163,659
Toledo, Peoria & Western	Dec.	239	124,397	325	129,747	11,710	22,806	12,839	87,377	10,030	144,762	111.6	—15,015	—13,915	—23,127	18,021
	12 mos.	239	2,193,379	6,617	2,273,837	309,473	283,337	146,162	814,002	109,699	1,662,673	73.1	611,164	533,556	393,028	301,001
Toledo Terminal	Dec.	28	.....	.....	113,238	13,416	15,030	609	57,390	6,239	92,684	81.8	20,554	3,241	28,808	60,846
	12 mos.	28	.....	.....	1,606,937	131,655	214,185	7,037	681,733	65,855	1,096,967	68.3	509,970	314,490	585,023	687,566
Trinity & Brazos Valley	Dec.	367	210,843	8,207	235,514	110,286	288,391	7,131	91,319	12,834	504,474	214.2	—268,960	—277,241	—314,913	57,911
	12 mos.	367	2,600,800	81,958	2,822,293	801,648	689,557	69,769	1,019,510	147,211	2,703,612	95.8	118,681	23,980	—400,265	201,375
Ulster & Delaware	Dec.	128	21,430	3,214	56,644	10,750	12,743	1,221	35,848	4,171	64,733	114.3	—8,089	—8,889	—9,897	—13,376
	12 mos.	128	424,595	221,473	1,094,104	187,606	182,626	16,385	521,871	49,337	957,825	87.5	136,279	70,775	32,346	64,099
Union R. R. of Penna.	Dec.	45	.....	.....	619,473	72,046	176,649	178	328,843	18,011	595,522	96.1	23,951	37,771	89,037	298,362
	12 mos.	45	.....	.....	11,031,307	861,452	2,191,460	2,083	4,305,698	176,185	7,534,445	68.3	3,496,862	3,120,755	3,975,884	3,264,519
Union Pacific	Dec.	3,765	6,238,984	1,104,118	8,283,899	609,760	1,868,683	200,080	2,543,346	344,877	5,708,242	68.9	2,575,657	1,967,804	1,839,707	2,055,832
	12 mos.	3,765	95,482,356	14,924,988	121,099,778	13,571,798	23,944,972	2,283,335	32,819,723	4,129,894	79,044,064	65.3	42,055,714	33,334,339	29,721,493	31,071,696
Oregon Short Line	Dec.	2,538	2,267,327	284,663	2,803,868	306,455	451,454	53,292	874,687	131,323	1,863,296	66.5	940,572	528,488	440,203	818,809
	12 mos.	2,538	32,478,296	3,862,343	39,462,471	5,696,968	5,596,854	679,995	11,130,159	1,583,755	25,555,418	64.8	13,907,053	9,803,144	8,605,758	8,574,323
Oregon-Wash. R. R. & Nav. Co.	Dec.	2,364	1,779,426	248,137	2,290,611	275,033	316,296	76,950	840,492	131,383	1,675,574	73.1	615,037	488,292	363,375	243,661
	12 mos.	2,364	23,478,040	2,951,546	29,225,194	4,794,275	4,341,683	940,932	10,668,085	1,605,452	22,689,901	77.6	6,535,293	4,207,167	2,531,083	2,143,474
Los Angeles & Salt Lake	Dec.	1,225	1,557,882	328,456	2,112,063	360,274	350,557	91,060	656,977	89,274	1,621,543	76.8	490,520	297,363	185,331	139,324
	12 mos.	1,218	20,350,665	4,596,298	27,569,150	4,182,968	4,399,591	1,005,080	8,076,838	1,043,728	19,737,179	71.6	7,831,971	5,881,860	4,467,234	2,029,502
St. Joseph & Grand Island	Dec.	....	Not yet filed.													
	12 mos.	....	Not yet filed.													
Utah	Dec.	....	Not yet filed.													
	12 mos.	....	Not yet filed.													
Virginian	Dec.	545	1,521,324	34,833	1,638,995	108,626	319,186	13,272	322,829	33,314	797,086	48.6	841,909	691,904	786,042	669,446
	12 mos.	545	13,526,328	337,319	19,871,636	1,951,724	3,593,529	168,212	3,901,411	389,918	9,981,399	50.2	9,890,237	7,853,952	8,792,097	7,096,053
Wabash	Dec.	2,523	4,213,828	637,759	5,355,508	507,616	841,338	190,394	2,316,722	263,938	4,086,280	76.3	1,269,228	1,023,014	735,392	1,625,886
	12 mos.	2,523	63,796,583	7,042,372	76,632,974	10,273,862	12,922,779	2,237,293	27,985,608	2,732,956	56,275,423	73.4	20,357,551	17,092,548	13,251,590	11,950,039
Ann Arbor	Dec.	293	400,781	29,798	445,374	29,551	46,273	13,933	200,189	12,013	300,031	67.4	145,343	117,152	78,692	97,121
	12 mos.	293	5,767,513	209,677	6,244,153	659,536	1,248,918	173,829	2,367,915	152,067	4,567,992	73.2	1,676,161	1,354,687	1,042,452	935,312
Western Maryland	Dec.	879	1,491,630	24,006	1,570,211	273,673	300,494	44,208	415,092	40,875	1,075,291	68.5	494,920	398,418	449,029	324,139
	12 mos.	878	17,973,269	320,481	19,006,497	3,049,661	3,642,290	511,755	4,962,680	503,544	12,709,408	66.9	6,297,089	5,238,999	5,819,526	5,251,029
Western Pacific	Dec.	1,051	1,108,112	63,984	1,269,439	205,136	263,082	66,921	543,631	52,315	1,164,489	91.7	104,950	—422	48,191	232,666
	12 mos.	1,051	14,927,798	1,370,104	17,687,896	3,173,070	3,262,187	856,470	6,068,117	596,364	14,438,043	81.1	3,249,853	1,961,125	2,501,516	2,581,011
Wheeling & Lake Erie	Dec.	511	1,015,772	27,145	1,112,774	116,458	315,235	38,949	424,762	45,179	939,359	84.4	173,415	155,809	159,506	323,722
	12 mos.	511	19,746,432	257,448	21,335,222	2,553,713	5,069,848	471,131	6,022,994	580,863	14,693,178	68.9	6,642,044	5,085,125	5,115,433	4,975,836
Wichita Falls & Southern	Dec.	203	135,984	1,139	142,278	12,711	7,219	2,944	28,465	2,895	54,015	37.96	88,263	90,141	84,346	47,688
	12 mos.	183	1,092,657	18,232	1,180,517	181,987	129,823	31,972	331,250	49,339	724,131	61.34	456,386	397,279	324,139	324,606

News of the Week

(Continued from page 397)

130 of $25 each; 23 of $20 each; 17 of $15 each; five of $10 each; and three of $5 each.

Another part of the statement shows individual bonuses for conductors and trainmen ranging from $12.50 to $110, the latter sum being paid to those with perfect records throughout 12 months.

Withdrawal of Eastern Unification Plans Suggested

Charles D. Mahaffie, director of the Bureau of Finance of the Interstate Commerce Commission, has addressed letters to the Baltimore & Ohio, the Chesapeake & Ohio, the Delaware & Hudson and the Wabash, suggesting the withdrawal or dismissal of the applications filed by these companies last year, each of which asked the approval by the commission of a comprehensive plan for the allocation of a group of eastern roads to a large system. Although the B. & O. and C. & O. plans were filed last February, and the others at later dates, they have never been set for hearing and Mr. Mahaffie's letter expresses the view that hearings on them now would be useless. He tells each applicant that—

"Since this application was filed the commission, in Docket No. 12,964, has promulgated its plan for the consolidation of the railway properties of the United States into a limited number of systems. ...This application is not complete in that it does not present the terms or conditions, nor the consideration, on which it is proposed to acquire the lines covered by it. It is not in all respects in accord with the complete plan above referred to. ...It should either be withdrawn by you or dismissed by the commission. Before making a recommendation in the matter, however, I would appreciate the benefit of your views on this."

After filing its general unification plan last February the Baltimore & Ohio later filed another application for authority to acquire control of the Buffalo, Rochester & Pittsburgh, and just before the promulgation of the plan it filed another as to the Buffalo & Susquehanna. Both of these applications stated specific terms and conditions and the company asked and obtained hearings on them without reference to its earlier general application. The Chesapeake & Ohio has also recently filed specific applications covering the Chesapeake & Hocking and the Hocking Valley and that as to the Chesapeake & Hocking has been granted. All of these applications are in harmony with the plan.

Grade Crossing Elimination Discussions in N. J.

The proposal of Governor Larson of New Jersey that the legislature of that State pass a bill to legalize a definite program whereby the State and railroads would divide equally the cost of grade crossing eliminations was discussed by W. L. Kinter, general counsel of the Reading, in an address at the South Jersey dinner of the New Jersey State Chamber of Commerce at Camden, N. J., on January 23. The proposal of the Governor has also received considerable newspaper support, the Camden Post having sponsored the program in a recent editorial entitled "Shall the Slaughter Go On?"

Mr. Kinter opened his remarks with that statement that "It would be impossible to improve on the concise, comprehensive and forceful presentation of the grade crossing problem which Governor Larson made in his first annual message to the legislature now in session.

"In briefest summary," continued the speaker, "the Governor shows that by placing on the railroad companies substantially all the cost of grade crossing elimination, the present Fielder Act has seriously retarded the abolition of grade crossings in New Jersey. This law does not fit the present-day conditions and is out of line with the laws of practically all the other states. The remedy for the present situation is the substitution for the Fielder Act of a law which will fairly apportion between the public and the railroads the expense of eliminating grade crossings."

The speaker next proceeded to outline the finding set forth in the recent report of a committee headed by State Senator Francis B. Davis. This report reveals that in New Jersey there is a total of 2,932 grade crossings of which some 859 carry medium or heavy railroad traffic, and 684 carry medium or heavy highway traffic. Figures on fatal New Jersey grade crossing accidents of recent years are next quoted as Mr. Kinter continued to a discussion of the responsibilities and costs in the premises and their equitable division among the railroads and other interested parties.

He found in conclusion that "the public is mainly responsible for the grade crossing problem and that the public derives a much greater share of material benefit from grade crossing eliminations than do the railroads. It logically follows that the railroads should not be asked to bear more than 50 percent of the cost of eliminating grade crossings."

The Camden Post editorial, mentioned at the outset, approached the question from the standpoint of fatal accidents and held that because of this loss of life "it is up to our legislature at this season to speed action on eliminating grade crossings!" It finds next that "the railroads have been prompt to express a willingness to support the Governor's plan" although, it continued, "It would be cheaper for the railroads to let people die at crossings. The average cost of damage suits is small in comparison to the millions required to eliminate crossings.

"But the railroads are not as soulless as corporations are supposed to be. They know that life is not measured in dollars and cents. So they are willing to go half way in this work."

Figures on estimated costs of abolishing the major crossings follow. For the abolition of these it is deduced that the state's share of the cost would be $36,000,000, or, on a six year basis about $12,000,000 out of the $60,000,000 proposed to be spent on New Jersey highways within the next two years.

* * * *

Co-operative Shop Management Committee of the Canadian National, Meeting in Montreal, Que.

Under the Canadian National co-operative plan, committees representing the management and the various shop crafts work together in the budgeting of work and similar matters to produce greater continuity of operation, together with economy in production. The plan was introduced in the Canadian National shops a few years ago and has proved a great success. The photograph here reproduced shows Vice-President S. J. Hungerford of the C. N. R. addressing the shop craft representatives at a recent committee session in Montreal.

Traffic

The Southern Pacific has opened a freight office at 1425 South Racine avenue, in the produce center of Chicago, as a supplement to the service rendered patrons at its "loop" offices.

The number of new industries established at points on and near the lines of the Central of Georgia during the year 1929, was 259, or an average of one new industry for each 7½ miles of road. These concerns employ 12,541 persons.

The Missouri-Kansas-Texas has established fast freight service from St. Louis, Mo., and Kansas City to points in Texas. The schedule of the cars that leave Kansas City at 4 a.m. is 26½ hr. to Dallas and Ft. Worth, 30½ hr. to Waco and 48 hr. to San Antonio and Houston.

The General Managers' Association of New York has purchased 10 impact recorders which will be placed in freight cars moved in the New York terminal district as a part of its study of freight handling. The plan of procedure is similar to that employed by the General Managers Association of Chicago, started in April, 1929.

Contract warehouses in Philadelphia affected by the recent order of the Interstate Commerce Commission directing the Baltimore & Ohio, the Pennsylvania and the Reading to cease their practice of making allowances for loading and unloading of package freight to the warehouses have asked the commission to postpone the effective date of the order to February 10, to enable them to contest the order in court.

Rail-and-water freight rates from Chicago and the mid-west to the Pacific Northwest became effective on February 1. Shipments to which these rates apply move over the Illinois Central from Chicago to New Orleans, La., and thence over the Redwood Line, which operates a fleet of steamers through the Panama canal, to points in Oregon and Washington. Similar rates from Chicago and other mid-western points to Los Angeles, Cal., and San Francisco were published by the Illinois Central and the Redwood Line on May 31, 1928.

The Chicago & North Western has recently completed motion pictures showing the activities involved in moving trains in and out of the Chicago terminal and the operation of the freight transfer house and the hump and classification yards at Proviso, Ill. The films show how they handle 308 passenger trains a day and how they deal with the suburban crowds at the station during the morning and evening rush hours. More than 23,000 people leave the station on suburban trains between 5 p.m. and 6 p.m. The total number of passengers using the terminal last year was 25,840,726, an increase of 1,270,696 over the previous year.

The Colorado & Wyoming has been granted permission by the Public Utilities Commission of Colorado to discontinue all passenger service over its Southern division on April 1. Service is operated from Tercio to Trinidad, 31.9 miles, the railroad owning that portion from Tercio to Jarsen, 29.8 miles and using the tracks of the Atchison, Topeka & Santa Fe into Trinidad. The line was constructed primarily to serve proposed and existing coal mines, coke ovens and timber operations, but these activities have either ceased or been curtailed so that there has been a material reduction of the population and the passenger business.

Uniformity in Recoopering, Etc.

A report of the Joint Committee of the Freight Claim and Operating divisions of the American Railway Association concerning claims paid in connection with shipments of fresh fruit and vegetables has been approved by both divisions. The report recommends the establishment of uniform practices for recoopering, salvage and bad order notations at destination points, and that the services of the weighing and inspection bureau having jurisdiction at the principal delivery points, or some similar organizations, be used by all lines to supervise unloading, checking, recoopering and delivery of fruits, melons and vegetables.

A Freight Claim Blank

The New York Central has adopted a form for reporting damage to automobile shipments which form is designed to reveal the actual causes and location of the damage. The form is in quadruplicate, one copy being for the superintendent, one for the claim department, one for the superintendent of property protection and one for the consignee. Four diagrams show the front, rear, right and left side of the automobiles in the car and enable the inspector to definitely locate the damaged part. A total of 29 questions are included so that the causes reported by the various employees will be uniform.

Traffic Increases in Maritimes

A general improvement in the economic conditions of Canada's Maritime Provinces has been reflected by substantial increases in both passenger and freight traffic along the Canadian National, says M. F. Tomkins, traffic manager, Atlantic Region, C.N.R. "Prosperity in the Maritimes will be advanced by a number of new undertakings now in sight," he added, "Among these is a new power development for Sydney, N. S., which will electrify the coal mines. Along with this there is the new pulp and paper mill to be opened at Liverpool, N. S., in November, and another which will be ready for operation next month."

Mr. Tomkins said that agriculture and mining are both in a healthy state, while the tourist business has grown considerably. To cater to the increasing number of visitors, the railway has built a hotel in Halifax to be opened in May and is completing another one at Charlettetown, Prince Edward Island, to be opened in the summer.

Pennsylvania Transfer Tariff Suspended

The Interstate Commerce Commission on January 31 suspended for seven months, from February 2 to September 2, for investigation, the operation of a tariff filed by the Pennsylvania proposing to meet the competition of the Baltimore & Ohio motor coach service in New York City by authorizing the transfer, without additional charge, of passengers in parties of 25 or more persons traveling together, between the Pennsylvania station in New York, and any point within the boroughs of Manhattan, Bronx and Brooklyn, and between the Pennsylvania station at Newark, N. J., and any other points in Newark. The transfer was to be allowed when such passengers hold tickets to or from certain designated territories applicable over the Pennsylvania, in general east of Pittsburgh, Oil City and Erie.

Protests asking the suspension of the tariff had been filed with the commission, as reported in last week's issue, by the New York Central, the Pittsburgh & Lake Erie, the Delaware, Lackawanna & Western and the Erie. These roads also asked the commission to undertake an investigation of the Baltimore & Ohio practice. The commission, however, postponed consideration of the latter request for a later conference.

C. P. R. Plans Housing for Shrine Convention

The Canadian Pacific is planning to build a "Fez City" to accommodate a population of 8,000 people when the pilgrimage of Shriners goes to Toronto in June on the occasion of the annual sessions of the imperial council. The "city" will be composed mainly of sleeping cars, with tents in place of administration and service buildings. Altogether there will be 300 sleeping cars in "Fez City" in addition to numerous cars for employees, for kitchen use, and for baggage, linen, ice and fuel.

In the tents will be housed the various services such as postal information, telephone, express, parcel and messenger services. There will be an office for cashing and issuing money orders and travelers' checks. The information and ticket office will be open day and night, while every sleeping car will be connected by telephone with the main switchboard in the administration building.

There will also be a miniature hospital and a one-day laundry service as well as an hour-to-hour cleaning and pressing service. Shower baths, a barber shop, shoe shine and beauty parlor will also be provided. A large tent will house the sandwich restaurant as well as the news stand, cigar stand and candy counter.

The "city" will be lighted by electric light. A large taxi stand, close to the administration building, will cater to the transportation needs of the visitors. In addition there will be a bus service and sports facilities.

Chicago Traffic Club Holds Annual Dinner

The Traffic Club of Chicago held its twenty-third annual dinner at the Palmer House, Chicago, on January 30 with 1,600 people in attendance. The Rt. Hon. George P. Graham, P. C., ex-minister of railways and canals of the Dominion of Canada, and Lawrence H. Whiting, president of the Boulevard Bridge Bank of Chicago, were the principal speakers, their subjects being "Playing Safe" and "Business Trends." Mr. Graham commented upon the good freight service being rendered by the railroads and the loss in passenger traffic. The loss in passenger service due to automobiles, he said, has been more than compensated for by the gain in freight revenue. If, he continued, the manufacture of automobiles was discontinued, the railroads would suffer a loss much greater than the present loss in passenger revenue. He also spoke of the development of Canadian railways, the desirability of an equal exchange of United States and Canadian money and the London naval conference.

Mr. Whiting said that business will continue to be conducted in 1930, but that those who wish to secure a share of it will have to spend less time on the golf course and do less pleasure traveling. He also called attention to the favorable position of railroad securities, saying that the public, because of its confidence, is investing in this form of security.

Air-Rail Transportation

Traffic figures of the country's air-rail passenger service were given in a paper entitled "Aviation and the Railroads" read before the Railway Club of Pittsburgh at its meeting on January 23 by R. W. Cost, railroad and aviation fighting engineer, Westinghouse Lamp Company.

The figures revealed that 4,346 passengers have thus far been carried over more than two million miles in the air-rail service of the Transcontinental Air Transport. "Passenger planes, some of which have been operating only since June 14th last, when the Universal Air-Rail Service was inaugurated, carried 20,659 passengers over 2,301,221 miles," Mr. Cost said. In addition, the air mail loads of the Boeing line rose from 493 tons in 1928 to 906 tons last year; passenger totals went from 1,963 to 2,850.

Mr. Cost continued to discuss the recent fare reductions on these air transport lines and the possible effects of these rate concessions on future traffic. He also explained in detail the nature of the service, and the routes which they cover, before turning to a discussion of air-rail transportation for express traffic.

In this latter connection, Mr. Cost quoted from recent statements of E. M. Cowie, president of the Railway Express Agency, Inc., and C. M. Keys, president of the Curtiss-Wright Corporation, which statements stressed the value of this expedited service for express shipments. Mr. Cost closed his consideration of this phase of air transportation with a discussion of accident figures pointing out the safety records of the lines involved.

Midwest Shippers' Board

Agricultural and industrial activity in the midwest in the first three months of 1930 will show but little change from the level reached in the first quarter of 1929, according to the business forecasts made at the sixth annual meeting of the Midwest Shippers' Advisory Board at Chicago on January 9. In this territory in the first quarter of 1929, 1,220,164 freight cars were loaded with the 29 principal agricultural and industrial products covered by the board's report. The corresponding traffic in the first three months of 1930 is expected to be 1,213,000 cars.

Increased movement is anticipated amounting to 1 per cent in grain; 2 per cent in poultry and dairy products; and 3 per cent for canned goods; machinery and boilers 5 per cent; agricultural implements 5; brick and clay products 7; hay, straw and alfalfa 12; petroleum and its products 15; fertilizers 28; cement 30; and potatoes 33 per cent.

In the following, little or no change is expected: flour and meal, coal and coke, ore and concentrates; salt, sugar, syrup and molasses; paper, paperboard and prepared roofing; chemicals and explosives.

Anticipated decreases were reported as follows: live stock 2 per cent; lumber and forest products 3; iron and steel 5; fresh vegetables 7; fresh fruits 15; gravel, sand and stone 15; lime and plaster 35 per cent.

The principal address at the meeting was made by J. M. Fitzgerald, of New York, representing the Committee on Public Relations of the Eastern Railroads. Mr. Fitzgerald emphasized the improvements which have been made by the railways in recent years giving credit for this improvement to the investment of large amounts of new capital, and to the more intelligent use of rail facilities by the public for which, he said, the members of the Shippers' Advisory Boards throughout the country are to be accorded due credit.

"That the railways should provide efficient service without burdensome rates was expected," said Mr. Fitzgerald. "That they have been able to provide an ever-increasing efficiency with steadily declining freight rates, constitutes the outstanding industrial achievement since the war, an accomplishment to which your organization has made a substantial contribution.

"Good rail service having become a habit, it is only natural that we should be seeking the still better service of tomorrow. Already we hear demands for still greater efficiency. Can we have all the desired improvements? If the railways are treated on the basis of sound business economics, if they are permitted to earn the fair return which was promised to them, if they are allowed to retain a fair share of their income after they do earn it; then we may expect them to move steadily forward to greater usefulness."

Costs $8.23 a Ton to Move Alberta Coal to Ontario

Shipments of coal from Alberta to Ontario for the three years in which the feasibility of marketing the product in the East has been under test will cost the Dominion Government at the rate of $1.48 a ton. This is the result of the finding of the Board of Railway Commissioners that the actual hauling cost is $8.23 a ton.

Early in 1928 an order-in-council was approved recommending a special rate in order that the possibility of developing a market in Ontario for Alberta coal might be determined. A seasonal rate of $6.75 a ton was set for those periods in the year when there was a surplus of cars on western railway lines. The Dominion government was to pay to the railways whatever amount was found to be short of actual haulage costs.

The experimental period comes to an end this year. In the meantime evidence as to the cost to the railroads has been presented to the Board of Railway Commissioners and their finding was made public last week.

The reaction in Alberta to the board's decision is generally to the effect that there is no chance of building up a market in the East if the operators have to face so heavy a carriage rate.

While no opinion was offered by the Interior Department officials in connection with the finding, it was stated that every effort was being made to solve the problem in another way. Experiments are being carried out with the hope of finding a method of refining western coal so its effective fuel value might be carried in a product of less volume and weight. These experiments are in the main directed towards pulverization and reduction of the coal to an oil.

The board reached its decision on cost of haulage figures submitted by the Canadian National and Canadian Pacific for 1928. The Canadian National carried 26,536 tons during this test period for which it received $175,637 under the $6.75 rate, this covering local and interline traffic. Claims for reimbursement, based on the difference between the tariff charge and the $6.75 rate were entered by the C.N.R., the sum asked totaling $159,198.

According to the submission of the National lines, the total cost of hauling its 1928 cargo of coal reached $334,850.

The Canadian Pacific, which hauled 5,944 tons during the 1928 test period, entered claims for reimbursement of $31,618. The railway claimed that haulage costs totaled $71,737, whereas it received $40,118 under the $6.75 rate.

THE LÖFFLER HIGH-PRESSURE LOCOMOTIVE, which is designed to operate at a steam pressure of about 1,900 lb. and with a superheating temperature of about 900 deg. F., has been completed and is now being tested on the German State Railways. It is reported that results of the first tests were satisfactory.

Foreign

Zambezi Bridge Proposed for East African Railways

In a report to the British Colonial Office, the Zambezi Bridge Commission, appointed in 1926 to consider general transportation developments in the Nyasaland Protectorate, has strongly recommended the construction of a bridge across the Zambezi river to replace the inadequate ferry service which is at present the only means of connection between railways north and south of the river.

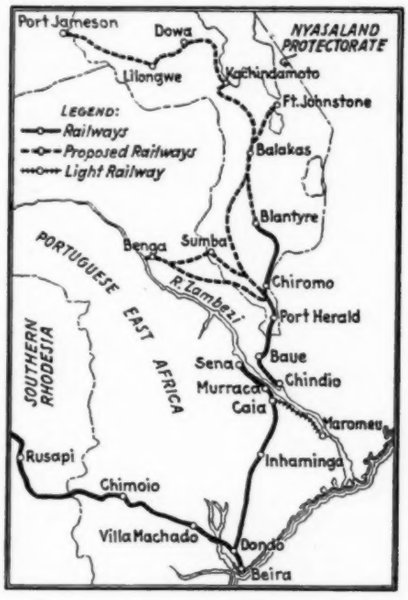
Nyasaland, a British colony 500 miles long by 75 miles wide, runs north and south between Northern Rhodesia and Lake Nyasa, while its southern half cuts deeply into Portuguese East Africa. Largely agricultural, its prosperity is mainly dependent upon the ease with which its crops of tobacco, cotton, sisal and tea can be exported through Portuguese territory to Beira, the nearest seaport.

Except for inadequate roads, and steamer service on Lake Nyasa, existing transportation facilities within Nyasaland and between its southern boundary and the seacoast are confined to the railroads shown on the accompanying map. Of these, the Shire Highlands Railway runs from Blantyre to Port Herald, 113 miles; the Central Africa Railway, 61 miles, from Port Herald to Chindio, in Portuguese territory on the north bank of the Zambezi, and the Trans-Zambezia, 157 miles long, from Murraca, on the south bank of the river opposite Chindio, to Dondo, with running rights over the Beira Junction Railway from Dondo to Beira, 18 miles. The three roads, all of 3 ft. 6 in. gage, are controlled by the Shire Highlands.

At present the only break in the 351-mile run from Blantyre to Beira is the distance of two miles between Chindio and Murraca, across the Zambezi river, where a primitive and inadequate ferry service is maintained by the Trans-Zambezia Railway with one steamer and ten barges. This ferry is the bottle-neck of the system and its capacity limits the traffic that can be carried between Nyasaland and the coast. The principal objection to the present ferry is the lack of facilities for the transportation of loaded freight cars, which necessitates the unloading and trans-shipment of all goods on both banks of the river. The impossibility of securing permanent and efficient labor; the annual fluctuations of the river, which make the construction of permanent ferry terminals out of the question; the difficulties of navigation at certain seasons; the steepness of the river banks, and the constant danger of washouts on the railway approaches contribute not only to the inadequacy of the existing ferry service but also to the impossibility of making it satisfactory except at prohibitive cost.

With probable traffic across the river estimated at 50,000 tons by 1937, the commission advises a bridge as "the only practical method of solving the problem of the Zambezi crossing." The site selected is about 25 miles up stream from the present railroad terminals, between Sena, on the south bank, and Mutarara on the north bank, one of the few points where the river is confined between definite banks with a permanent navigable channel and where satisfactory railroad approaches are available. From Sena a 28-mile line connecting with the Trans-Zambezia either at Murraca or at Milepost of 150, seven miles south of Murraca, is available, while on the north bank connection with the Central Africa at Baue could be made by the construction of 3¼ miles from the Mutarara bridgehead.

Of five types of bridges proposed, the commission selected a bridge 508 ft. long across the channel, of such height as to allow uninterrupted navigation, which



Existing and Proposed Railways in Nyasaland

would then run down, on a 0.43 per cent grade, to a trestle five feet above the highest flood level across the flat lands bordering the river. The cost of such a structure is estimated at £935,151 ($4,544,834), plus interest of £117,750 during a two-year construction period.

A 99-year concession, covering the construction and operation of such a bridge, was granted by Portugal to the British Central Africa Company in 1912, later transferred to the Central Africa Railway, and confirmed on November 2, 1925.

Although the bridge proposal is the most important feature of the commission's report, general transportation conditions throughout Nyasaland were investigated at length, and recommendations for their improvement made. Chief among these is the suggestion that the Shire Highlands Railway be extended to Balakas, 70 miles north of Blantyre, and from that point to the southern end of Lake Nyasa at Fort Johnston, 40 miles northeast. In this connection, the report says: "The ultimate destination of the railway will be Port Jameson, the principal town in northeastern Rhodesia. The cost of its construction, however, makes this a matter for the future. But any railway built in this direction should be located so as eventually to form part of such a line. An extension to Balakas fulfills this condition. It would also reach the furthest point common to the two objectives of Port Jameson and Port Johnston. . . . It would intercept existing traffic, which now goes to Blantyre by motor transport, and would earn an immediate return. It would save road haulage, and would enable a wider field to be opened up behind the present cultivated areas."

An alternative route to Balakas, starting at Chiromo, was suggested, with the purpose of securing easier grades and making some progress on a possible future line to the Sumba coalfields, but it was felt that these advantages would not compensate for leaving the important town of Blantyre off the main line.

The physical condition of the three railways was carefully examined, and various improvements to roadway, equipment and flood protection works are recommended to allow the handling of heavier traffic and insure against interruption by floods.

The purchase of a steamer, of 400 tons' capacity, for service to and from Fort Johnston on Lake Nyasa, is also suggested, as is the construction of heavy-duty roads to various points on the lake from agricultural areas in northern Nyasaland where railroads are unlikely to penetrate for some years to come.

With such a co-ordinated program of rail, lake and highway transportation put into effect immediately, under centralized control, which is advised, the commission estimates that Nyasaland's exports will increase from the 1926 total of 7,014 tons to a minimum of 18,000 tons by 1937; that total traffic across the Zambezi river will more than double; and that the net increase in revenue to the Nyasaland government, exclusive of any share in probable increased railway earnings, will amount to £115,000 annually within the next ten years.

The capital expenditures estimated by the commission as necessary to carry out the recommended improvements, which are well within the amount available from the East African Guaranteed Loan fund, are as follows:

New railway extensions and surveys, including interest during construction	£ 695,000
Lake service (steamer and pier)	60,000
Road construction in Nyasaland	160,000
Capital improvements to the Shire Highlands and Central Africa Railways, including new rolling stock	239,300
Capital improvements to the Trans-Zambezia Railway	119,000
Zambezi bridge, including interest during construction	1,060,000
	£2,333,300 ($11.339,838)

Equipment and Supplies

Locomotives

BOSTON & ALBANY.—See New York Central.

THE GEORGIA, ASHBURN, SYLVESTER & CAMILLA is inquiring for one 2-8-2 type locomotive.

THE LOUISVILLE & NASHVILLE is now inquiring for six 4-8-2 type locomotives. The authorization for this equipment was reported in the *Railway Age* of December 14.

THE NEW YORK CENTRAL has ordered ten 2-8-4 type locomotives from the Lima Locomotive Works and five 4-6-4 type locomotives from the American Locomotive Company. These are for service on the Boston & Albany. Inquiry for this equipment was reported in the *Railway Age* of November 16.

Passenger Cars

THE GULF, MOBILE & NORTHERN is inquiring for two gas-electric rail motor cars, three trailer cars and one observation car.

Freight Cars

THE AMERICAN REFRIGERATOR TRANSIT COMPANY is inquiring for 1,000 refrigerator cars of 40 tons' capacity.

THE ERIE has placed orders for the following equipment:

No.	Type	Builder
800	Hopper	Standard Steel
100	Automobile	Pressed Steel
100	Furniture	Pressed Steel
450	Gondola	Greenville
500	Box	American Car & Fd'y.
200	Automobile	American Car & Fd'y.

Van Sweringen Lines Place Orders For New Freight Cars to Cost $30,144,000

President J. J. Bernet of the Chesapeake & Ohio has announced that contracts have been let for new freight cars at a total cost of $30,144,000. This calls for 11,350 cars as in the table below.

Inquiry for this equipment was reported in the *Railway Age* of January 4.

Road	No.	Type	Tons	Builder
Chesapeake & Ohio	1500	Steel Hopper	70	Standard Steel
	1500	Box		Standard Steel
	1500	Flat Bottom Gondola	50	American Car & Fdy.
	500	Box with end doors		Pressed Steel
Pere Marquette	1500	Box		Standard Steel
	1500	Auto Box		Pullman
	750	Flat Bottom Gondola	50	Ralston
	500	Auto Box		Pressed Steel
	250	Furniture Box		Pressed Steel
	100	Flat		Bethlehem
	250	Flat Bottom Gondola	70	Greenville
Hocking Valley	1500	Flat Bottom Gondola	50	American Car & Fdy.

Machinery and Tools

THE ATCHISON, TOPEKA & SANTA FE is inquiring for a tool and cutter grinder.

THE ERIE has ordered two 25-ton, 8-wheel, steam-driven locomotive cranes from the Orton Crane & Shovel Company.

THE CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC is inquiring for the following machine tools:

1 18-in. by 8-ft. lathe	1 boring mill
2 20-in. by 8-ft. lates	1 locomotive cylinder boring bar
1 22-in. by 10-ft. lathe	
4 24-in. by 10-ft. lathes	1 universal miller
1 24-in. by 12-ft. lathe	1 portable boring bar
1 30-in. by 14-ft. lathe	1 three-spindle threader
1 4-in. turret lathe	2 13-in. hacksaws.
1 20-in. sensitive drill	1 magnetic separator
1 ½-in. to 2-in. pipe cutter	1 24-in. disk grinder
	1 39-in. crank planer
1 100-ton hydraulic bushing press	1 1,100-lb. steam hammer
1 3-in. drill grinder	1 pneumatic grinder
1 circular relief grinder	1 electric furnace
1 36-in. slip roll former	1 electric tool furnace
3 4-ft. radial drills	1 6-ft. radial drill
5 32-in. heavy duty shapers.	1 90-in. journal turning machine
3 36-in. plane-shapers	1 37-in.-16-in. jar reaming turnover power drawing machine
1 36-in. heavy-duty shaper	

THE ST. LOUIS-SAN FRANCISCO has ordered from Manning, Maxwell & Moore, Inc., three H. G. Hammett's radius link grinding machines for use in its St. Louis, Mo., West Tulsa, Okla., and Kansas City, Mo., shops. Orders have also been placed for two Micro Machine Company's heavy duty railroad internal grinders for the St. Louis and West Tulsa shops; one Micro Machine portable locomotive crank pin grinding machine for its St. Louis shops and one Peck-Stow & Wilcox ring and circular shear for its Springfield, Mo., shops.

Miscellaneous

THE ERIE has given a contract to the Pusey & Jones Corporation, Wilmington, Del., for the construction of four steel tugboats equipped with Diesel-electric drive. They will be 108 ft. long with 26-ft. beam and a depth of 13 ft. 9 in. The tugs will be operated in New York harbor.

THE LOUISVILLE & NASHVILLE will receive bids on February 19 for lubricating oils and greases for current consumption extending over a period of one, two or three years from March 1, 1930. The types and quantities are as follows:

150,000 gal.	valve oil for valves and cylinders
147,000 gal.	car oil for locomotive use
28,000 gal.	car oil for passenger car use
181,000 gal.	car oil for freight car use
35,000 gal.	flange oil for flange oilers
45,000 gal.	signal oil for lanterns
296,000 lb.	driving-journal compound
190,000 lb.	special driving-journal and crank-pin grease for rod cups and crank pins
93,000 lb.	hub and center plate grease

Iron and Steel

THE TOLEDO, PEORIA & WESTERN is inquiring for 500 tons of structural steel for a bridge at Peoria, Ill

Supply Trade

The Detroit Steel Products Company, Detroit, Mich., has purchased Holorib, Incorporated, Cleveland, Ohio.

The H. K. Ferguson Company, Cleveand, Ohio, has opened a branch office at 520 North Michigan avenue, Chicago; **Henry Maag,** contract engineer being in charge.

The Massey Concrete Products Corp. and the **Canadian Concrete Products Co., Ltd.,** have moved their Montreal office to room 310, Dominion Square building, 1010 St. Catherine street, West.

The National Aluminate Corporation, Chicago, has opened a branch office at 1313 Santa Fe building, Dallas Tex. **C. M. Bardwell** has been appointed southwestern railway representative in charge of this office.

J. E. Buckingham has been appointed manager of the railroad department of the **Worthington Pump & Machinery Corporation,** with headquarters at Harrison, N. J., and **W. B. Savary** has been appointed assistant to the manager, with headquarters at the same point.

Stuart M. Crocker, who on January 1 resigned as vice-president and treasurer of the United Electric Securities Company to become assistant to the president of the **International General Electric Company,** has been elected a vice-president of the latter company, with office at New York.

W. B. Simpson, president of the **A. M. Castle & Company,** Chicago, has been elected chairman of the board of directors. **A. C. Castle,** first vice-president has been elected president to succeed Mr. Simpson and **Fred C. Flosi** has been elected a director to take the place of **Sidney Gardiner.**

The annual dinner of the **Chicago Railway Equipment Company** was held at the Union League club in Chicago on February 4. For some years it had been the practice of this company to invite a large number of guests who were not directly connected with its business, but this year the party consisted entirely of officers and employees of the company.

Ralph Leavenworth, account executive of the **Austin Company,** Cleveland, Ohio, has been appointed assistant general sales manager. Mr. Leavenworth will have contact with sales activities at the headquarters office, Cleveland, and the various branch offices throughout the country. Prior to joining the Austin staff, he was secretary and account executive of Paul Teas, Inc., advertising agency.

Foote Bros. Gear & Machine Company, Chicago, has appointed **Max E. Landry,** 202 Local building, Oklahoma

City, Okla., its representative in the northern half of Oklahoma. The **Ammex Equipment Company,** 406 San Francisco street, El Paso, Tex., has been appointed district representative of the Texas territory lying west of a line drawn from Farwell to Sweetwater and then south to Spofford, and including all of New Mexico and all the states of Mexico, except the states of Nuevo Leon and Tamaulipas.

W. E. Corrigan, who for a number of years has represented the **American Locomotive Company** and the **Railway Steel-Spring Company** as district sales manager at San Francisco, Cal., has been transferred to their newly opened offices in the Tower building, Cleveland, Ohio. **O. R. Hale,** district sales manager of the two companies at Pittsburgh, Pa., has been transferred to San Francisco to succeed Mr. Corrigan. **Arthur W. Sullivan** will continue as sales agent with offices in the Farmers Bank building, Pittsburgh.

M. W. Seymour is now associated with the New York office of the **Roller-Smith Company** as a sales engineer. Mr. Seymour is a graduate of Brown University and for several months prior to his connection with the New York office he was located at the company's works, at Bethlehem, Pa. **H. D. Stier,** Atlanta, Ga. now represents the Roller-Smith Company in the states of Alabama, Florida, Georgia, North Carolina and South Carolina and the **H. N. Muller Company,** Pittsburgh, Pa. now represents the company in western Pennsylvania, West Virginia and the Youngstown district in Ohio; associated with Mr. Muller are **H. E. Ransford** and **F. E. Harper.**

Nelson L. Rehnquist and **Howard R. Gass** were elected vice-presidents of the **St. Louis Car Company,** at the annual meeting in St. Louis, Mo., January 28. **George L. Kippenberger** was elected first vice-president and assistant general manager. **Edwin B. Meissner** was re-elected president and general manager. Mr. Rehnquist was with the Milwaukee Electric Railway & Light Company until 1911 when he went to St. Louis to take charge of the car company. He will have jurisdiction of the purchases and stores and aircraft activities. Mr. Gass was formerly valuation engineer for the Missouri State Public Service Commission until 1920 and since that time has been with the St. Louis Car Company in its sales department; he will continue in that department.

E. C. Waldvogel, vice-president in charge of sales of the **Yale & Towne Manufacturing Company,** Stamford, Conn., who has been in this company's service for the past 25 years will retire from active participation in the company's affairs on April 1, in order to devote more of his time in future to personal affairs; he will however continue with the company in an advisory capacity and will hold the office of vice-president and remain a director. **Walter B. Dodge,** who has been assistant to the vice-president in charge of sales has been appointed manager of all Stamford hardware sales. Mr. Dodge entered the service of the Yale & Towne Manufacturing Company as a young man, twenty-four years ago and his duties have been diversified and numerous in sales work. **James C. Morgan** takes complete charge of all materials handling equipment sales; he went to the Yale & Towne Manufacturing Company from the C. W. Hunt Company about ten years ago.

Harry C. Frey, general purchasing agent of the **General Railway Signal Company,** Rochester, N. Y., has been appointed assistant to Vice-President **F. W. Moffett,** with the same headquarters. **Elmer G. Knapp,** assistant purchasing agent for the past four years assumes Mr. Frey's duties as purchasing agent. Mr. Frey began his railroad career 43 years ago in the freight department of the Lehigh Valley at Bethlehem, Pa. In 1890 he entered the employ of the National Switch & Signal Company and successively was associated with the Union Switch & Signal Company, the Pneumatic Signal Company, and the General Railway Signal Company, having been with the latter organization in charge of purchasing for the past 25 years. Elmer G. Knapp has been with the General Railway Signal Company in his present capacity for the past four years.

B. F. Affleck, who has been elected president of the newly organized **Universal Atlas Cement Company,** was born on March 1, 1869, at Belleville, Ill. He entered business with the Harrison Machine Works at Belleville in 1885, and four years later entered the employ of the American Express Company at St. Louis, Mo. From 1890 to 1896, he was connected with the St. Louis, Alton & Terre Haute (now a part of the Illinois Central) and from the latter date until 1906 with the Illinois Steel Company. In 1906 he entered the employ of the Universal Portland Cement Company, serving as sales manager at Chicago until 1915 when he was elected president, which position he has held until his recent election.

B. F. Affleck

The P. H. & F. M. Roots Company, Connersville, Ind., manufacturers of rotary positive blowers, pumps and meters has merged with other interests and is now under the control of the **Stacey Engineering Company,** Columbus, Ohio. The new organization includes the P. H. & F. M. Roots Company, the Connersville Blower Company, Connersville, the Wilbraham-Green Blower Company, Pottstown, Pa., and the Stacey Brothers Gas Construction Company, Cincinnati, Ohio. The officers of the new company include **Colonel Carmi A. Thompson,** president; **Corwin Abbott,** vice-president and general manager; **Fletcher S. Heath,** vice-president; and **Erle G. Meeks,** secretary and treasurer. **E. D. Johnston,** who for the past forty-five years has been connected with the P. H. & F. M. Roots Company, has resigned as president of the company and has retired from active business. All companies involved in the merger will maintain their separate identities and organizations, and will continue to operate separately until the final plans of the merger can be definitely consummated.

Identity of Greenville Steel Car Company Retained

The Greenville Steel Car Company, which has been acquired by the Pittsburgh Forgings Company as noted in the February 1 issue of the *Railway Age,* retains its identity and now has on its board of directors the following members: Frank L. Fay, chairman, F. D. Foote, K. C. Gardner, W. S. Dietrich, George H. Rowley, Edwin Hodge, Jr., and J. T. Brennan. The officers of the Pittsburgh Forgings Company are Edwin Hodge, Jr., president, F. D. Foote, vice-president, R. A. Mitchel, vice-president in charge of operations and C. E. Rafter, treasurer. Mr. Gardner becomes executive vice-president of the Greenville Steel Car Company, and W. S. Dietrich continues as vice-president in charge of operations, both with offices at Greenville. Mr. Fay, who continues as chairman of the board of the Greenville Steel Car Company, becomes a member of the board of the Pittsburgh Forgings Company, and Mr. Brennan continues also as assistant vice-president of the Greenville Steel Car Company.

The Pittsburgh Forgings Company, producers of drop forged and upset products, recently purchased the plant of the Riverside Forge & Machine Company, Jackson, Mich., which has since been operated as the Riverside division of the Pittsburgh Forgings Company, specializing in the forging and machining of automobile hubs. The Pittsburgh plant is located at Coraopolis and produces automobile, railroad and miscellaneous forgings and upset products. The acquisition of the Greenville Steel Car Company still further diversifies the business of the Pittsburgh Forgings Company in the production of railroad forgings. The Greenville company manufactures new railroad equipment, including dump cars, and steel car parts and handles car repairs.

Obituary

Warren Phelps King, vice-president of the Aluminum Company of America, Pittsburgh, Pa., died suddenly of a heart attack in Sarasota, Fla., on January 15. He was born at Ithaca, N. Y., on September 9, 1865, and was a member of the class of 1888 at Cornell University. His first business connection was with the Lehigh Valley Coal Company in Buffalo. Later he was associated with the New York Car Wheel Company as assistant to the president. About 1907, he bought an interest in the Brooks Brothers Brass Foundry Company and in a short time this company was reorganized and became the Liberty Brass Foundry Company of which he was made president. In 1910, the Liberty Brass Foundry Company merged with

Warren Phelps King

the Allyne Brass Foundry Company and others to form the Aluminum Castings Company and he became vice-president in charge of sales of the merged companies. The Aluminum Castings Company was reorganized in November, 1919, into the Aluminum Manufacturers, Inc., with Mr. King first as vice-president and then as president. Mr. King took an important part in the inception and development of the casting of aluminum under gravity pressure in metallic molds in America. At the time of his death, he was a vice-president of the Aluminum Company of America, president of Aluminum Manufacturers, Inc., and a director in several additional companies.

Trade Publication

STEEL AND IRON SHEETS.—The American Sheet and Tin Plate Company, Pittsburgh, Pa., has issued a booklet entitled "The Testimony of Science and Service," which gives authoritative information on the exposure tests conducted by the American Society for Testing Materials. This booklet is impartial in its presentation of the weather tests conducted on the various grades of sheets and shows in a clear manner the results of these tests up to the present time.

Construction

ABILENE & EASTERN.—Witnesses before T. F. Sullivan, examiner for the Interstate Commerce Commission, at a hearing at Abilene, Tex., from January 27 to 30 on the application of the Abilene & Eastern to construct a railroad between Abilene and Cross Plains, 45 miles, stated that the district which the line would serve contains much undeveloped oil land. In addition, the railroad would serve ten oil pools which have already been developed. The Abilene & Eastern application is opposed by the Texas & Pacific because the construction is to be financed through the sale of stock to citizens of Abilene who are the principal receivers and shippers of freight handled by the Texas & Pacific in that city, J. L. Lancaster, president of that road, declared. H. E. McGee, vice-president and general manager, and George T. Atkins, vice-president of traffic of the Missouri-Kansas-Texas, appeared in behalf of the new railroad offering to grant the Abilene & Eastern trackage rights between Cross Plains and the main line of the Katy at De Leon, 40 miles.

ATCHISON, TOPEKA & SANTA FE.—The War Department has approved the application of this company for the construction of a bridge over the Illinois river, near Chillicothe, Ill., to replace an existing bridge at that point.

BANGOR & AROOSTOOK.—The new turntable which this company is to install at Northern Maine Junction, Me., at a cost of $30,918, is to be 100 ft. long and will replace an existing table 70 ft. long. The new turntable which has been authorized at Oakfield, Me., at a cost of $31,024, will also be 100 ft. long, replacing an existing 65-ft. turntable. The original authorization for these new tables, both of which are to be electrically operated, was reported in the *Railway Age* of January 11.

CHICAGO, ROCK ISLAND & PACIFIC.—The application of this company for permission to reconstruct its bridge over the Des Plaines river and the Illinois and Michigan canal at Joliet, Ill., has been approved by the Department of War.

DELAWARE & HUDSON.—The Public Service Commission of New York has directed the elimination of the Main street crossing of this company's tracks in Altamont, N. Y., by diverting Main street traffic through a subway to be built 55 ft. southeast of the present crossing. The grade of the railroad is to be raised about five feet at the new crossing. Exclusive of land and damages, the cost of the elimination is estimated at $240,000.

ERIE.—The Public Service Commission of New York has directed the elimination of the Moscow-Genesee county highway grade crossing at Cuylerville station, N. Y., by depressing the highway on the present line, raising the grade of the railroad about six feet and carrying the highway under the tracks. The cost is estimated at $119,000, exclusive of land and damages. The commission has also approved plans for the installation of an automatic flashing signal at the Soldiers Home crossing in Bath, N. Y.

HOCKING VALLEY. — The Industrial Brownhoist Corporation, Cleveland, Ohio, to whom the Hocking Valley Land & Development Co. has awarded a contract for the improvement of its coal-handling dock at the new Presque Isle terminal at Toledo, Ohio, has let a contract to the Austin Company, Cleveland, for construction of electric sub-stations at the dock.

ILLINOIS CENTRAL. — This company plans the expenditure of about $75,000 for the rehabilitation of the Tennessee Terminal and Warehouse building on Front street, near Calhoun avenue, Memphis, Tenn.

NEW YORK CENTRAL—ERIE—CANADIAN NATIONAL.—The Public Service Commission of New York has notified these three companies that it does not consider as excessive the low bid submitted by the Hecker-Moon Company, Cleveland, Ohio, for the construction, relocation and track elevation required in connection with the elimination of the Austin, Amherst, Tonawanda and other street grade crossings in Buffalo, N. Y. The figure for the entire contract is $510,925, divided as follows: New York Central, $310,949; Erie, $76,405, and Canadian National, $123,571. The railroads have also been directed to award the necessary contracts and to proceed with the work. The New York Central has awarded the contract for its share of the elimination work to the Hecker-Moon Company.

NEW YORK CENTRAL.—The New York Public Service Commission has approved specifications and estimates of cost submitted by this company for grade crossing eliminations, as follows: New street, Coxsackie, N. Y., $4,900; West Schuyler Dike road, east of Utica, N. Y., $119,600, and Red Creek-Oswego highway, Hannibal, N. Y., $115,700.

NEW YORK CENTRAL.—This company has awarded contracts as follows: To the John J. Bradley Engineering & Contracting Company, New York City, for grading and track work between West Seventy-Sixth street and West 124th street, New York City; to the Pittsburgh Bridge & Iron Works, New York, for the construction of signal towers for Park avenue viaduct and for railings for a bridge at West Sixty-Seventh street, New York City; and to the Walsh Construction Company, Syracuse, N. Y., for

the elimination of the Pierce's highway grade crossing at Theresa, N. Y., and for the elimination of Peru and Jack Reef grade crossings, Memphis, N. Y. The Public Service Commission of New York has directed the elimination of the North Main street crossing in Pawling, N. Y. The plan for elimination, as submitted by the railroad, calls for the construction of a 53-ft. plate girder bridge south of the present crossing, at a probable cost of $101,701.

NORTHERN PACIFIC—UNION PACIFIC.—Construction of the joint line from Moclips, Wash., to the Hoh river, 60 miles, in the Olympic peninsula, will be undertaken about April 1.

QUANAH, ACME & PACIFIC.—The Interstate Commerce Commission has authorized this company to construct five miles of railroad from Quanah, Tex., to Acme.

SACRAMENTO NORTHERN.—A contract for the grading and tracklaying for the construction of a line between Vacaville Junction, Cal., and Creed, 7.5 miles, has been let to the Utah Construction Company, San Francisco, Cal. The total estimated cost of constructing this line is about $400,000.

ST. LOUIS-SAN FRANCISCO.—This company plans the construction with its own forces of creosoted timber trestles, one-half mile and three-fourths mile long, respectively, at Big Lake and at the St. Francis river near Monette, Ark.

TEMISKAMING & NORTHERN ONTARIO.—The Temiskaming & Northern Ontario Railway Commission will receive bids until 12 o'clock noon, February 18, for the construction of the first section of the proposed 85-mile extension of this road. This section will run from the present railhead at Coral Rapids, Ont., to Moose river, a distance of 45 miles, and will cost approximately $2,000,000. Construction of the rest of the extension, which will ultimately involve an expenditure of some $6,000,000, from Blacksmith Rapids to Moose Factory on James Bay, will be started as soon as the location of the Moose River bridge has been decided upon and as soon as it is economically practicable to begin the work.

UNION PACIFIC.—The general contract for the construction of the new passenger station at Omaha, Neb., comprising its portion of the new union station facilities in that city, has been awarded to Peter Kiewit's Sons, Omaha.

THE PUNCTUALITY of Long Island Railroad passenger trains in the month of January was nearly perfect; that is to say, of the 27,305 regular trains operated in that month, 27,261 arrived at destination on time, making a 99.9 per cent record for efficiency. During the same month, 2,361 extra passenger trains were run. There was only one day in the month when the record was below 99 per cent.

Railway Finance

BALTIMORE & OHIO.—*Convertible Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue $63,031,000 of 30-year 4½ per cent convertible bonds and to issue when and as required $52,525,800 of common stock in conversion. Stockholders will be offered the right to subscribe to the bonds at 95 and interest to the extent of 20 per cent of their holdings. Kuhn, Loeb & Co., and Speyer & Co., has agreed to underwrite the issue for 2½ per cent and to purchase at 95 and interest such bonds as are not taken by the stockholders. The proceeds are to be used to retire maturing obligations, to purchase stock of the Buffalo, Rochester & Pittsburgh and the Buffalo & Susquehanna, if authorized, and to provide $33,276,558 for authorized expenditures for additions and betterments.

CENTRAL OF NEW JERSEY.—*Equipment Trust Certificates.*—This company has applied to the Interstate Commerce Commission for authority for an issue of $480,000 of 4½ per cent equipment trust certificates.

CENTRAL OF NEW JERSEY.—*Control of Wharton & Northern and Mount Hope Mineral.*—The Interstate Commerce Commission has authorized this company to acquire control of the two above-mentioned short-line railroad companies in Northern New Jersey by the purchase of capital stock, 100 per cent of that of the former company and 68.3 per cent of that of the latter, at a price for all the stock involved of $1,250,000.

CENTRAL VERMONT.—*Receivership Ends.*—The property of the Central Vermont Railway Company, which has been in receivership since December 12, 1927, with George A. Gaston and J. W. Redmond as receivers, passed to the Central Vermont Railway, Inc., on January 31 when Charles D. Watson, special master of the United States District Court, gave the deed to the property to Vice-President George A. Gaston, of the new company. The receivership of this property was brought about as a result of the terrific damage suffered to the line at the time of the Vermont flood two years ago last autumn. More than 253 miles of the company's track in Vermont were swept away by the flood waters and 54 bridges were destroyed. Under the receiver's the line has been completely rehabilitated and was turned over to the new railway today in better physicial condition than it was in prior to the flood. Improvements of every nature have taken place over the entire length of the line. The receivers purchased considerable amount of new equipment including ten new locomotives and 1,000 new automobile cars. They also had built a new enginehouse at White River Junction, Vt., and greatly improved the yard facilities at that point.

CHESAPEAKE & OHIO.—*Acquisition of Hocking Valley.*—No opposition was presented at the hearing on January 30 before Examiner Haskell C. Davis of the Interstate Commerce Commission on this company's application for authority to acquire the property of the Hocking Valley by issuing to that company 247,879 shares of the C. & O. stock, in the ratio of 2¼ shares to one of Hocking Valley stock. R. S. Marshall, vice-president of the C. & O., submitted a mass of statistical data in support of the application and to show that the terms and conditions would be just and reasonable to the stockholders of both roads.

CHICAGO & WESTERN INDIANA.—*Bonds.*—The Interstate Commerce Commission has authorized this company to issue $99,000 of 4 per cent, 50-year consolidated bonds to be delivered to its tenant lines upon the cancellation of equivalent amounts of 6 per cent mortgage bonds through the operation of a sinking fund.

CINCINNATI, HAMILTON & DAYTON.—*New Name of Operating Company.*—This company, the Lima Toledo Railroad and the Indiana, Columbus & Eastern Traction Company (J. H. McClure, receiver) are being operated under the name of the Cincinnati & Lake Erie Railroad Company.

DENVER & RIO GRANDE WESTERN.—*Moffat Road Control.*—J. S. Pyeatt, president of the Denver & Rio Grande Western, announced at Denver, Colo., on February 1 that that railroad had purchased 21,334 shares of the 50,000 shares of common stock of the Denver & Salt Lake, and had agreed to purchase an additional 7,635 shares upon authorization by the Interstate Commerce Commission. The D. & R. G. W. has applied to the Commission for permission to acquire a controlling interest in the Moffat line. The purpose of the stock purchase, according to the announcement, is to bring about the early construction of the Dotsero cut-off, between Dotsero, Colo., and Orestod, to form a connection between the two roads. It was stated that the construction might be delayed by the appeal of the Moffat Tunnel Commission from the recent decree of the United States District Court respecting the validity of the Moffat tunnel lease.

DENVER & RIO GRANDE WESTERN.—*Acquisition of Denver & Salt Lake.*—This company has applied to the Interstate Commerce Commission for authority to acquire control of the Denver & Salt Lake, which has a line from Denver to Craig, Colo., 255 miles, through the Moffat tunnel, by purchase of a majority of its capital stock for $155 a share. Approval of the application would pave the way for the immediate construction of the Dotsero cut-off, from Orestod on the D. & S. L., to Dotsero on the D. & R. G. W., 41 miles, and enable the D. & R. G. W., by operating over the cut-off and through the tunnel, to shorten its route from Denver to Salt Lake City from 745

to 572 miles, a saving of 173 miles. The commission had approved the construction of the cut-off by the Denver & Salt Lake Western on condition that a satisfactory agreement be reached for operation over the line by the D. & R. G. W., which had opposed the granting of the application except upon such a condition, and which had threatened to build a cut-off and tunnel of its own. A form of agreement had been drafted but not executed when the commission in December promulgated its consolidation plan, which allocated the Denver & Salt Lake to the proposed Missouri Pacific system, which includes the D. & R. G. W. After this, according to the application, the latter company obtained an opportunity to acquire and did acquire 21,334 shares of the stock of the D. & S. L. at $155 a share and to enter into an agreement with Geo. H. Burr & Co., dated January 21, for the purchase of 7,635 additional shares at the same price, subject to the approval of the commission. The two blocks make a total of 28,969 shares or 57.938 per cent of the 50,000 outstanding. The Denver & Salt Lake at one time had proposed the construction of an extension from its western terminus at Craig to Provo, Utah, but this project was at least temporarily dropped in favor of the cut-off.

JACKSONVILLE & HAVANA.—*Receivership.*—Elmer Nafziger, an attorney at Springfield, Ill., was appointed receiver of this railroad on February 1 by Federal Judge Louis Fitzhenry following the filing of a petition by the Standard Oil Company of Indiana.

JACKSONVILLE, GAINESVILLE & GULF.—*Abandonment.*—Examiner Weed of the Interstate Commerce Commission has recommended that the commission authorize the abandonment of this company's line from North Gainesville to Sampson City, Fla., 18 miles.

NEW YORK CENTRAL. — *Acquisition.* — This company has applied to the Interstate Commerce Commission for authority to acquire joint control with the Canadian Pacific of the Canadian Pacific Car and Passenger Transfer Company, Ltd., which operates a ferry service between Ogdensburg, N. Y., and Prescott, Ont., by acquiring half its capital stock for $25,000. The N. Y. C. has been using the service of the ferry company under contract.

NEW YORK CENTRAL.—*Acquisition.*—This company has applied to the Interstate Commerce Commission for authority to acquire control of the Federal Valley by purchase of its entire capital stock for $150,000, an amount fixed by agreement as a result of arbitration.

NEW YORK CENTRAL.—*Leases Take Effect.*—The leasing by the New York Central of the Cleveland, Cincinnati, Chicago & St. Louis, the Michigan Central and other of its subsidiaries went into effect on February 1.

PENNSYLVANIA.—*Lease of W. N. Y. & P.*—The directors of the Western New York & Pennsylvania and the Pennsylvania Railroad have agreed to recommend to the stockholders a 999-year lease of the former company to the latter, effective July 1, 1930, for which the P. R. R. company shall pay an annual rental equal to fixed charges, taxes and dividends of 5 per cent on preferred stock and 6 per cent on common stock of lessor.

The Pennsylvania acquired control of the Western New York & Pennsylvania in 1900, through the purchase of a large majority of the capital stock and income bonds, thus extending the lines of the Pennsylvania System into Buffalo, N. Y. Under a lease that was renewed yearly, the Pennsylvania operated the Western New York & Pennsylvania until August 1, 1903, when a twenty-year lease became effective. Since the expiration of that twenty-year term, the lease has run from year to year.

PITTSBURGH & WEST VIRGINIA.—*Bonds.*—The Interstate Commerce Commission has authorized this company to issue $6,000,000 of first mortgage, 5 per cent, 30-year bonds, series C, to be sold at not less than par for the purpose of defraying a portion of the construction costs of its extension in Pennsylvania.

QUANAH, ACME & PACIFIC.—*Abandonment.*—The Interstate Commerce Commission has authorized this company to abandon its operation under trackage rights over the line of the Fort Worth & Denver City between Quanah, Tex., and Acme, 4 miles, and to build a 5-mile line of its own between those points.

SABINE BASIN.—*Joint Line Proposed.*—This company has been organized by the Gulf, Colorado & Santa Fe and the Beaumont, Sour Lake & Western to construct and acquire, under control of the Atchison, Topeka & Santa Fe and the Missouri Pacific, a line from Beaumont to Port Arthur, Tex., by acquisition of a right of way and some tracks of the Eastern Texas Electric Company and the construction of six spur tracks. The main line will be 13 miles and the total mileage 35. The Sabine company proposes to issue $250,000 of stock to the Atchison and Missouri Pacific subsidiaries, which have asked authority to operate over its tracks and also for plan for the pooling and division of freight and earnings.

TEXAS MEXICAN.—*Operation.*—The Interstate Commerce Commission has authorized this company to operate the 3-mile line of the San Diego & Gulf from Byram, Tex., to Palangana.

Dividends Declared

Delaware & Hudson.—2½ per cent, quarterly, payable March 20 to holders of record February 26.

Maine Central.—Preferred, $1.25, quarterly, payable March 1 to holders of record February 15.

New York, Chicago & St. Louis.—Common, $1.50; Preferred, $1.50, both payable April 1 to holders of record February 15.

St. Louis Southwestern.—Preferred, 1¼ per cent, quarterly, payable March 31 to holders of record March 12.

Average Prices of Stocks and of Bonds

	Feb. 4	Last week	Last year
Average price of 20 representative railway stocks.	132.32	130.60	136.81
Average price of 20 representative railway bonds..	92.44	92.10	92.00

Railway Officers

M.C. and Big-Four Continue Under Same Vice-Presidents

With the lease by the New York Central of the Michigan Central, the Chicago, Kalamazoo & Saginaw, the Cleveland, Cincinnati, Chicago & St. Louis, the Cincinnati Northern and the Evansville, Indianapolis & Terre Haute, effective February 1, **Edmond D. Bronner,** was appointed vice-president, with jurisdiction over the Michigan Central and Chicago, Kalamazoo & Saginaw. Mr. Bronner was vice-president of those properties prior to the lease. **Harry A. Worcester,** who was appointed vice-president, with jurisdiction over the Big Four, Cincinnati Northern and the E. I. & T. H., has been vice-president operating those roads for years prior to the lease. The New York Central in a statement says that, while leasing these properties has accomplished a practical unification of them with the New York Central, they will continue to be operated by the vice-president appointed, as heretofore, but with a closer connection with the parent line. It is stated that all other officers and employees of the lessor companies are continued in their respective capacities.

Executive

Clive Runnells, vice-president of the Pullman Car & Manufacturing Corporation, with headquarters at Chicago, has been elected to a similar position with the Pullman Company.

M. E. Barnes, chief clerk to the receivers of the Central Vermont, has been appointed assistant to the vice-president of the newly organized Central Vermont

M. E. Barnes

Railway, Inc. Mr. Barnes was educated at the public schools, and started his railway career with the Central Vermont on October 26, 1903, as an office boy in the audit office. After two years of service he was promoted to junior

clerk and stenographer in the office of the general manager. From this position he was advanced to assistant paymaster, private secretary to the general manager, chief clerk of the mechanical department, and traveling car service agent. On April 13, 1921, Mr. Barnes was appointed assistant to the federal manager of the Central Vermont, while the road was under control of the United States Railroad Administration. Upon the return to private ownership, he was appointed assistant to the general manager. On January 15, 1928, he was appointed chief clerk to the receivers, the position he held until his recent appointment as assistant to the vice-president.

John Douglas, assistant general freight agent of the New York, New Haven & Hartford, with headquarters at Boston, Mass., has been appointed assistant to vice-president, traffic department, with headquarters at New Haven, Conn. Mr. Douglas entered railroad service on October 25, 1902, with the New York, New Haven & Hartford, in the local freight

John Douglas

office at Worcester, Mass., and has been continuously in the employ of the traffic department of this road since that time. In 1905, he was appointed freight cashier at Worcester and in 1907 traveling freight agent, and on August 1, 1920, he was promoted to the position of general agent at Worcester, in which capacity he served until April, 1928, when he was appointed assistant general freight agent with headquarters at New Haven. On August 12, 1929, he was transferred from New Haven to Boston, and served as assistant general freight agent at that point until his promotion as assistant to the vice-president.

Financial, Legal and Accounting

W. I. Caldwell, chief clerk to the auditor of freight overcharge claims of the Chicago, Rock Island & Pacific, has been promoted to auditor of freight overcharge claims, with headquarters at Chicago, succeeding **F. W. Main,** who has retired from active service.

Frederick T. Harward, who has been appointed general attorney of the Grand Trunk Western, with headquarters at Detroit, Mich., has spent his entire career as a lawyer. He was born at Richmond, Me., in 1872, and graduated from Williams College in 1894. Upon obtaining his law degree from Yale University in 1897, he began the practice of law at Detroit.

Frederick T. Harward

From September, 1910, to September, 1925, in addition to his private law practice, Mr. Harward served as attorney for the Detroit United Railway until the street car lines were acquired by the city.

A. G. Gilmour, freight claim agent of the western region of the Canadian National, with headquarters at Winnipeg, Man., has been appointed auditor of freight claims, with headquarters at Montreal. Mr. Gilmour was born on February 7, 1886, at Strathaven, Scotland. He entered railway service with the Caledonian Railway (Great Britain) as a junior clerk in the freight department, serving at several stations, until

A. G. Gilmour

July, 1907, when he entered the employ of the Canadian Northern (now part of the Canadian National) at Winnipeg, as an investigator in the freight claim department. Three years later he was promoted to the position of chief clerk of the department. In June, 1914, he was appointed acting freight claim agent, and on January 1, 1915, freight claim agent, which position he held until the formation of the Canadian National. At that time, he was promoted to the position of freight claim agent, Western lines. In September, 1920, with the coordination of the Grand Trunk Pacific, he was appointed freight claim agent of that company also, and with the amalgamation of the Canadian National in the spring of 1923, he was appointed freight claim agent of the Western region, which position he held at the time of his recent appointment. For several years Mr. Gilmour has also been chairman of the Western Freight Claim Committee of the Railway Association of Canada.

Operating

R. R. Bragg, trainmaster on the El Paso-Amarillo division of the Chicago, Rock Island & Pacific at Dallas, Tex., has been promoted to assistant superintendent of that division with headquarters at Amarillo, Tex.

David C. Allen, chief clerk to the general manager of the Western region of the Pennsylvania at Chicago, has been promoted to assistant trainmaster of the Indianapolis division at Indianapolis, Ind.

William C. Bassett, assistant superintendent of telegraph of the Coast lines of the Atchison, Topeka & Santa Fe, with headquarters at Los Angeles, Cal., has retired under the pension rules of the company after 42 years of continuous service.

J. L. Kendall, superintendent of the De Quincy division of the Gulf Coast Lines, with headquarters at De Quincy, La., has been transferred to the Eastern division of the Missouri Pacific, with headquarters at Jefferson City, Mo., succeeding **T. W. Cheatham,** who has been granted a leave of absence.

R. M. Borden, chief clerk to the general manager of the First district of the Chicago, Rock Island & Pacific at Des Moines, Iowa, has been promoted to assistant to the general manager of that district, with headquarters at the same point, succeeding **H. F. Reddig,** deceased.

P. S. Lewis, superintendent of the Atlantic City Railroad, (a subsidiary of the Reading) has been appointed superintendent of the New York division of the Reading, with headquarters at Philadelphia, succeeding **W. F. Eckert** who has been assigned to special work in the office of the general manager. **John S. Goodman,** division engineer with headquarters at Reading, Pa., has been appointed superintendent of the Atlantic City Railroad.

J. V. Kennedy, general superintendent of the Cincinnati Northern, has been appointed superintendent of the newly created Northern division of the Cleveland, Cincinnati, Chicago & St. Louis, with headquarters as before at Van Wert, Ohio. **P. L. McManus,** general superintendent of the Evansville, Indianapolis & Terre Haute, has been appointed superintendent of the newly created Terre Haute division of the Big Four, with headquarters as before at

Terre Haute, Ind. Both appointments are incidental to the absorption of the C. N. and the E., I. & T. H. by the Big Four on February 1.

O. E. Maer, superintendent of the Wichita Valley, with headquarters at Wichita Falls, Tex., retired from active duty on February 1, after nearly 45 years of railway service, 20 of which have been with the Wichita Valley. Mr. Maer was born at Columbus, Miss., on June 14, 1870, and entered railroad service at the age of 15 years on the Mobile & Ohio. After serving a number of roads in various capacities, including those of train dispatcher and chief train dispatcher, Mr. Maer was appointed trainmaster on the St. Louis Southwestern at Malden, Mo., in 1903. Three years later he was transferred to Illmo, Mo., where he remained until 1907 when he was appointed superintendent of the Wichita Valley. The position of superintendent, occupied by Mr. Maer, has been abolished.

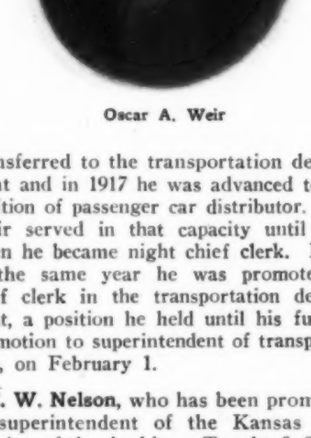
F. N. Melius, general superintendent and marine manager of the New York Central, has been appointed assistant general manager of the New York terminal district, including the marine department, with headquarters, as before, at New York. The positions of general superintendent of the New York terminal district, and marine manager, held up to now by Mr. Melius, are abolished. **A. H. Wright,** who assisted Mr. Melius in his former position, has been appointed assistant to the assistant general manager of the New York terminal district. **J. E. Davenport,** superintendent of the River division, has been appointed assistant to assistant general manager, New York terminal district. **G. H. Wilson,** superintendent of the Hudson division, will have his jurisdiction extended to include the Harlem and Putman division. **M. E. Welch,** superintendent of the Syracuse division at Syracuse, N. Y., has been appointed superintendent of the Electric division and superintendent of the Grand Central terminal, with headquarters at New York. **Owen O'Connor,** superintendent of the Harlem and Putnam divisions at White Plains, N. Y., has been appointed superintendent of the River division, with headquarters at Weehawken, N. J. **C. E. Olp,** superintendent of the Rochester division at Rochester, N. Y., has been appointed superintendent of the Syracuse division, with headquarters at Syracuse, N. Y. **W. H. Wood,** superintendent of the Ontario division at Oswego, N. Y., has been appointed superintendent of the Rochester division at Rochester, N. Y. A sketch of Mr. Wood's railway career, together with a reproduction of his photograph, appeared in the *Railway Age* of January 11, 1930, page 180. **C. K. Brodhead,** assistant superintendent of the Electric division and superintendent of the Grand Central terminal, has been appointed superintendent of the Ontario division, succeeding Mr. Wood. The territory of the Electric division has been extended to include that part of the Hudson division between Spuyten Duyvil and St. Johns Park, on the west side of Manhattan Island.

Oscar A. Weir, who has been promoted to superintendent of transportation of the Great Northern, with headquarters at St. Paul, Minn., entered the service of that railway in 1912 as a traveling car agent at St. Paul. A year later he was

Oscar A. Weir

transferred to the transportation department and in 1917 he was advanced to the position of passenger car distributor. Mr. Weir served in that capacity until 1926 when he became night chief clerk. Later in the same year he was promoted to chief clerk in the transportation department, a position he held until his further promotion to superintendent of transportation, on February 1.

C. W. Nelson, who has been promoted to superintendent of the Kansas City division of the Atchison, Topeka & Santa Fe, with headquarters at Kansas City, Mo., has been connected with that rail-



C. W. Nelson

way for 32 years. He obtained his first railroad experience as a yard clerk on the Lake Shore & Michigan Southern (now part of the New York Central), at Cleveland, Ohio, in 1892. From 1893 to 1895 he served as a switchman at Cleveland on the same road, then spending the next two years as a brakeman on the Mexican Central. Mr. Nelson entered the service of the Santa Fe in 1897 as a switchman at Argentine, Kan., then being promoted to yardmaster in 1906 and to trainmaster in 1912. In 1915 he was transferred to Marceline, Mo., where he remained until 1918, when he was promoted to assistant superintendent of the Kansas City division at Kansas City. His further promotion to superintendent of that division became effective on January 20.

Chris McDonough, who has been promoted to general superintendent of the Lake and Eastern districts of the Great Northern, with headquarters at St. Paul, Minn., has served in the engineering and operating departments of that road for 38 years. He was born at Boston, Mass., on October 18, 1876, and after attending high school obtained his first railway experience as a section laborer on the Great Northern at St. Cloud, Minn., in 1892. Mr. McDonough advanced through the positions of section foreman, extra-gang timekeeper, extra-gang foreman, clerk in the superintendent's office at Melrose, Minn., Havre, Mont., and Superior, Wis., and assistant road-

Chris McDonough

master at Hibbing, Minn. From 1901 to 1915 he served as chief clerk to the superintendent at Havre and to the general superintendent at Minot, N. D., Great Falls, Mont., and Superior, then becoming assistant to the general manager of the Spokane, Portland & Seattle at Portland, Ore. After a short period as chief clerk to the general superintendent of the Great Northern at St. Paul he was advanced to trainmaster at Whitefish, Mont., in 1917. In the following year he was promoted to superintendent of terminals at Cascade, Wash., where he remained until 1918, when he was transferred to the Cascade division, with headquarters at Everett, Wash. Mr. McDonough's promotion to general superintendent became effective on February 1.

J. B. Smith, who has been promoted to general superintendent of transportation of the Great Northern, with headquarters at St. Paul, Minn., has been connected with that road for 24 years. He was born at Delphi, Ind., on December 23, 1883, and entered railroad service in April, 1901, as a station helper on the

Atchison, Topeka & Santa Fe. Later he was advanced to telegraph operator and from 1903 to 1909 he served successively as a telegraph operator on the Missouri-Kansas-Texas, the St. Louis-

J. B. Smith

San Francisco and the Northern Pacific, and as a train dispatcher on the latter road. He then became a dispatcher on the Great Northern at Spokane, Wash., and was advanced to night chief dispatcher in 1915 and to chief dispatcher in 1917. In the following year Mr. Smith was transferred to Whitefish, Mont., advanced to trainmaster at Whitefish and then appointed chief clerk to the general superintendent of transportation at St. Paul. In 1920 he was promoted to assistant general superintendent of transportation at the same point and in 1928 he was further promoted to superintendent of transportation. His advancement to general superintendent of transportation became effective on February 1.

Roy A. McCandless, who has been promoted to general superintendent of the Central district of the Great Northern, with headquarters at Great Falls, Mont., has been connected with

Roy A. McCandless

that railroad for 35 years. He was born at Wilton Junction, Iowa, on June 5, 1879, and entered railway service on September 1, 1894, as a messenger on the Great Northern. He was then advanced to stenographer after completing a commercial course at night school in St. Paul, Minn. In 1902 he was appointed chief clerk to the superintendent of the Willmar division, then being transferred to Livermore, N. D., and later promoted to trainmaster. In the following year, Mr. McCandless was promoted to assistant superintendent of the Dakota division and after being transferred to the office of the general manager at St. Paul he served from 1907 to 1912 as assistant superintendent of the Minot division at Minot, N. D. He was promoted to superintendent of the Minot division, with headquarters at Minot, in 1912, his further promotion to general superintendent becoming effective on February 1.

Traffic

J. H. Cummings has been appointed general agent of the Chicago Great Western, at Houston, Tex., a newly created agency.

Daniel M. Bowman, passenger traffic manager of the Cleveland, Cincinnati, Chicago & St. Louis, with headquarters at Cincinnati, Ohio, has been promoted to passenger traffic manager of the New York Central system lines west of Buffalo, with headquarters at Chicago. A sketch of Mr. Bowman's railway career, together with a reproduction of his photograph appeared in *Railway Age* of March 23, 1929, page 682. His appointment also includes the C. C. C. & St. L., the M. C., and the P. & L. E.

Robert J. Menzies, assistant traffic manager of the New York Central, lines Buffalo and East, has been appointed traffic manager at New York, with jurisdiction over the freight traffic de-

Robert J. Menzies

partment. Mr. Menzies was born at Detroit, Mich., and entered railway service in 1882, as a messenger at Detroit, with the Merchants Despatch Transportation Company. He was successively assistant agent, traveling agent, agent at Buffalo, and state agent at New York, for this company. In 1907, he was appointed general eastern agent, and in 1908, he entered the direct service of the New York Central. The following year he was appointed general eastern freight agent at New York, which position he held until 1918, when he left their employ. When he returned, in 1925, he was appointed assistant traffic manager, the position he held at the time of his recent appointment.

P. B. Beidelman, general freight agent of the Great Northern, has been promoted to freight traffic manager, with headquarters as before at St. Paul, Minn. Mr. Beidelman has been connected with that railway for almost 30 years, entering its

P. B. Beidelman

service in 1900 as a clerk in the traffic department. Three years later he was advanced to foreign freight clerk and in 1906 he became general agent of refrigerator service. In 1916 he was promoted to assistant general freight agent at St. Paul, then being further promoted to general freight agent on July 1, 1928. Mr. Beidelman's appointment as freight traffic manager became effective on February 1.

P. H. Burnham, freight traffic manager of the Great Northern, with headquarters at St. Paul, Minn., has been promoted to western traffic manager, with headquarters at Seattle, Wash., succeeding **M. J. Costello,** deceased. Mr. Burnham entered the service of the

P. H. Burnham

Great Northern in 1897 as a clerk in the St. Paul freight office. Six years later he was advanced to assistant chief clerk and in 1905 he was promoted to traveling freight agent at St. Paul. Later he was transferred to Grand Forks, N. D., where he remained until

1909 when he was promoted to assistant general freight agent at St. Paul. In 1918 he was again promoted to general freight agent, then becoming freight traffic manager on July 1, 1928, a position he held until his promotion to western traffic manager, with jurisdiction over the lines west of Montana, on February 1.

Frederick H. Parker, assistant general freight agent of the Great Northern, has been promoted to general freight agent, with headquarters as before at St. Paul, Minn. He has been connected with that road for more than 42 years, entering railway service on July 1, 1886, as a clerk in the accounting department of the Chicago, St. Paul, Minneapolis & Omaha. On December 15, 1887, he became a clerk in the passenger department of the St. Paul, Minneapolis & Manitoba (now the

Frederick H. Parker

Great Northern) and from 1888 to 1894 he served successively as a clerk in the accounting department and as chief clerk to the auditor of passenger receipts of the Great Northern. Mr. Parker was then advanced to auditor of passenger receipts and in 1902 he became auditor of freight receipts, being promoted to assistant comptroller at St. Paul in 1911. In 1916 he was appointed assistant general freight agent at Spokane, Wash., later being transferred to St. Paul, a position he held until his promotion to general freight agent on February 1.

Frederick O. Stafford, assistant traffic manager of the lines of the New York Central system west of Buffalo, N. Y., has been promoted to traffic manager of those lines, with headquarters as before at Chicago. His jurisdiction will include also the Cleveland, Cincinnati, Chicago & St. Louis, the Michigan Central and the Pittsburgh & Lake Erie. Mr. Stafford was born at Tiverton, Ont., on June 16, 1876, and after attending the Ontario School of Pedagogy, Toronto, Ont., entered railway service in April, 1900, with the Merchants Despatch Transportation Company, a subsidiary of the New York Central. Later he served with this company at Sioux City, Iowa, Kansas City, Mo., Des Moines, Iowa, and St. Louis, Mo., and in January, 1911, he became general westbound agent of the New York Central at Chicago. In August, 1917, he was advanced to manager of the New York Central Fast Freight lines at Chicago, where he remained until July, 1920, when he was appointed general freight and passenger agent of the Rutland, with headquarters at Rutland, Vt. Mr. Stafford returned to the New York Central in August, 1924, as assistant freight traffic manager of the lines west of Buffalo at Chicago, then being promoted to freight traffic manager of the same territory in December, 1926. He was further promoted to assistant

F. O. Stafford

traffic manager of the lines west of Buffalo in November, 1927, a position he retained until his advancement to traffic manager of all the western lines of the New York Central on February 1.

Louis W. Landman, passenger traffic manager of the New York Central at Chicago, has been promoted to general passenger traffic manager of the lines of the system west of Buffalo, with headquarters at the same point, and including jurisdiction over the Big Four, the Michigan Central and the Pittsburgh & Lake Erie. Mr. Landman was born at Waynetown, Ind., on December 6, 1869, and entered railway service at the age of 17 years as a telegraph operator on the Indiana, Bloomington & Western (now part of the Big Four). Later he was advanced to ticket agent at Danville, Ill., and in 1889 he became city passenger and ticket agent for the

Louis W. Landman

Fort Wayne, Cincinnati & Louisville (now part of the New York, Chicago & St. Louis) at Fort Wayne, Ind. From 1890 to 1904 he served successively as southern passenger agent of the Columbus, Hocking Valley & Toledo and general traveling passenger agent of that company's successor, the Hocking Valley. For the following seven years, Mr. Landman acted as general agent for the Big Four at Toledo, Ohio, general agent of the passenger department of the New York Central at the same point, general western passenger agent of the Lake Shore & Michigan Southern (now part of the New York Central) at Chicago and general passenger agent of the Lake Erie & Western (now part of the Nickel Plate) at Indianapolis, Ind. In 1911 he was appointed general passenger agent of the Michigan Central at Chicago, then being promoted to passenger traffic manager of that road and the New York Central in March, 1920. His further promotion to general passenger traffic manager of the western lines of the system became effective on February 1.

C. N. R. Traffic Department Changes

A. M. Kirk, assistant to the passenger traffic manager of the Canadian National, has been appointed general passenger agent at Montreal with jurisdiction in respect to trans-Atlantic and trans-Pacific passenger traffic, and other special traffic as assigned. Mr. Kirk was born in Scotland in 1886. He commenced his railway service at Montreal, in 1910, as a stenographer, and served in the passenger traffic department from that time until 1916, when he was appointed excursion clerk. In 1920, Mr. Kirk was promoted to the position of general clerk, and in 1923 chief clerk to the passenger traffic manager of the Canadian National. In 1924, he was appointed assistant to the passenger traffic manager, which, position he held at the time of his recent appointment.

A. M. Kirk

George R. Fairhead, division freight agent of the Canadian National, with headquarters at Hamilton, Ont., has been appointed general freight agent, with headquarters at Montreal. Mr. Fairhead commenced his railway career in 1896, as a clerk in the freight traffic

department of the Grand Trunk (now part of the Canadian National) at Toronto. In 1899 he was transferred to the staff of the general agent, and in 1902 served in the traffic department of the Canadian Northern (now part of the Canadian National). In 1905 he was appointed city freight agent; in 1907

George R. Fairhead

traveling freight agent; in 1910 commercial agent at Hamilton, Ont., in 1919 division freight agent at Toronto, Ont., and in 1927 division freight agent at Hamilton, Ont., which position he held at the time of his recent appointment.

Walter E. Dobbs, general office assistant to the general passenger traffic manager of the Canadian National, has been appointed assistant to the general passenger traffic manager, with headquarters at Montreal. Mr. Dobbs commenced railway service in 1904, as clerk and stenographer in the car service department of the Grand Trunk at Montreal, Que. In 1907, he was appointed secretary to the passenger traffic manager, and in 1910 he was transferred to Winnipeg, to serve as stenographer,

Walter E. Dobbs

excursion clerk, chief rate clerk, and chief clerk to the general passenger agent of the Grand Trunk Pacific (now part of the Canadian National. In 1920, Mr. Dobbs was transferred to Vancouver as chief clerk to the general passenger agent, and in 1924 he was again transferred to Montreal as chief clerk to the passenger traffic manager. The following year he was appointed general office assistant to the general passenger traffic manager, which position he held at the time of his recent appointment.

G. E. Smith, traveling freight agent of the Canadian National, has been appointed district freight agent, with headquarters at Toronto.

Engineering, Maintenance of Way and Signaling

W. H. Woltemate, supervisor of the Reading, with headquarters at Wayne Junction, Philadelphia, has been appointed division engineer with headquarters at Tamaqua, Pa., succeeding **W. R. Dunn,** who has been transferred to a similar position with headquarters at Reading, Pa.

R. P. Long, division engineer of the Chicago Terminal division of the Wabash, with headquarters at Chicago, has been transferred to the Moberly division, with headquarters at Moberly, Mo., succeeding **V. R. Hayes,** who has been transferred to the Decatur division, with headquarters at Decatur, Ill. Mr. Hayes replaces **J. E. Danes,** who retired from active service on February 1.

J. G. Wishart, who has been promoted to principal assistant engineer of the Chicago, Rock Island & Pacific, with headquarters at Chicago, has been connected with the engineering department of that road for nearly 26 years. He was born at Niagara Falls, N. Y., in 1879, and after graduating from Englewood High School, Chicago, entered railway

J. G. Wishart

service in the engineering department of the Rock Island at Chicago, in 1901. In the following year he became a draftsman on the Chicago & Western Indiana, then returning to the Rock Island as a draftsman at Chicago in 1905. Mr. Wishart was advanced to chief draftsman in the engineering department in 1912, and was promoted to office engineer at Chicago in 1914. His further promotion to principal assistant engineer became effective on January 16.

Jesse H. Oppelt, who has been appointed signal engineer of the New York, Chicago & St. Louis, with headquarters at Cleveland, Ohio, has been connected with that road for nearly 29 years. He was born at Washington, Iowa, on October 24, 1879, and after graduating from high school at Conneaut, Ohio, in 1899. took a correspondence course in railway engineering. Mr. Oppelt entered railway service in 1901 as a rodman on the Nickel Plate, four years later being advanced to inspector of bridges and masonry. From 1907 to 1910, he served as supervisor of interlocking and supervisor of water service and was then appointed supervisor of signals. In this position he served successively at Bellevue, Ohio, and Cleveland until his promotion to signal engineer on January 1.

Mechanical

Victor U. Powell, assistant master mechanic on the Illinois Central at Chicago, retired from active duty on December 31 after 43 years of railway service.

D. H. Foster, assistant engineer of tests of the Missouri-Kansas-Texas, with headquarters at Parsons, Kan., resigned on January 1 to become lubricating sales engineer of the Mid-Continent Petroleum Company at Tulsa, Okla.

Hugh Ronalds, assistant master mechanic of the Lehigh & New England, with headquarters at Pen Argyl, Pa., has been appointed master mechanic, with the same headquarters, replacing **R. L. Wyman,** deceased. The office of assistant master mechanic has been abolished.

S. B. Andrews, mechanical engineer of the Chesapeake & Ohio, with headquarters at Richmond, Va., has been appointed engineer of motive power of the advisory mechanical committee of that company, the Erie, the Hocking Valley, the New York, Chicago & St. Louis, and the Pere Marquette, with headquarters at Cleveland, Ohio.

Frank B. Harman, assistant superintendent, in charge of the locomotive department, of the San Bernardino (Cal.) shops of the Atchison, Topeka & Santa Fe, has been promoted to superintendent of the Albuquerque, (N. M.) shops, succeeding **D. E. Barton,** who has been assigned to other duties. **Henry C. Moore,** erecting shop foreman at the San Bernardino shops, has been promoted to assistant superintendent of shops at that point, replacing Mr. Harman.

The jurisdiction of **J. P. Roquemore,** master mechanic of the Louisiana division of the Missouri Pacific, with headquarters at Monroe, La., was extended on February 1 to include the Little Rock division. On the same date the jurisdiction of **R. Smith,** master mechanic of the Union of Memphis, with headquarters at Memphis, Tenn., was extended to include the Memphis divi-

sion of the Missouri Pacific. **Mr. Roquemore** and Mr. Smith succeed **J. B. Crahan,** who had jurisdiction over both the Louisiana and Memphis divisions.

Special

R. E. Gresham has been appointed director of athletics of the Missouri Pacific, with headquarters at St. Louis, Mo., with general supervision over athletic and recreational associations, and co-operating with all departments in the promotion and conduct of athletic activities on the railroad.

Dr. Duncan Eve, Jr., assistant to the chief surgeon of the Nashville, Chattanooga & St. Louis and associate professor of surgery at the Vanderbilt School of Medicine, has been promoted to chief surgeon, with headquarters at Nashville, Tenn., succeeding his father, **Dr. Duncan Eve,** who retired from active duty on January 1, after 51 years as that road's chief surgeon.

Dr. E. E. Lafferty, has been appointed chief hospital surgeon of the New Orleans Great Northern, including Jackson, Miss., terminal, with headquarters at Bogalusa, La. **Dr. J. H. Slaughter** has been appointed assistant chief hospital surgeon, with headquarters at Bogalusa, La. **Dr. Willis Walley,** has been appointed assistant chief surgeon, with headquarters at Jackson, Miss., with jurisdiction over hospital service on Pearl River district, Jackson, Miss., to and including Union, Miss., and will perform emergency hospital service only for New Orleans Great Northern employees at Jackson, Miss. All other hospital cases of these employees will be sent to Bogalusa Hospital. **Dr. A. E. Gordin,** has been appointed district surgeon, Pearl River district, with headquarters at Jackson, Miss. All New Orleans Great Northern local surgeons are to report to Dr. Lafferty at Bogalusa, La.

Obituary

J. V. Clifford, trainmaster on the Northern division of the Gulf, Colorado & Santa Fe at Cleburn, Tex., died at Fort Worth, Tex., on January 4.

George Smith Shafer, president of the Norfolk & Portsmouth Belt Line, with headquarters at Norfolk, Va., died at his home in Portsmouth, Va., on January 29.

J. H. Redding, general superintendent of the Western Pennsylvania division of the Pennsylvania, with headquarters at Pittsburgh, Pa., died on February 2, at the age of 53 years.

Albert W. Anderson, president and general manager of the Charleston & Western Carolina, died at his home in North Augusta, S. C. on February 3, after an illness of two weeks. He was 66 years old.

Herbert L. Browne, former assistant general freight agent of the Missouri-Kansas-Texas at Houston, Tex., died in New York on December 29, following a fall on the ice. Mr. Browne resigned from railway service on June 1, 1929, and at the time of his death was the representative of the Houston Port Bureau at New York.

Thomas N. Gilmore, who served as assistant to the general superintendent of motive power of the Chicago, Rock Island & Pacific at Chicago during 1904 and 1905, died at his home at El Paso, Tex., on January 15. Mr. Gilmore had also served for a time as master mechanic of the Terminal Railroad Association of St. Louis.

Joab Mulvane, former right of way agent of the Atchison, Topeka & Santa Fe, during the period of construction of its major lines in Kansas, with headquarters at Topeka, Kan., died at Los Angeles, Cal., on December 26 at the age of 92 years. In 1887 Mr. Mulvane became president of the Chicago, Kansas & Western, a subsidiary of the Santa Fe organized for the purpose of acquiring and extending various short lines in Kansas. He served in that capacity, and as an officer of other Santa Fe subsidiaries, for a number of years.

Daniel Wingerd Gross, assistant to the president of the Atlantic Coast Line, with headquarters at Wilmington, N. C., died from a heart attack on January 23. Mr. Gross was born on September 25, 1871, at Harrisburg, Pa., and was educated in civil engineering at Pennsylvania State College. He entered railway service in 1893 with the Beech Creek (now part of the New York Central) as roadman. In 1906 he entered the employ of the Atlantic Coast Line and from that time until his death he has served with that road as engineer of roadway, engineer of construction, valuation engineer, corporation engineer, and assistant to president.

Frank L. Wood, assistant general manager of the Pullman Company, with headquarters at San Francisco, Cal., died at the Swedish hospital at Seattle, Wash., on December 7, following an extended illness and an operation. During government control of the railroads and for three years thereafter, Mr. Wood served as assistant to the federal manager and assistant to the vice-president and general manager of the Pullman Company at Chicago. He had been in Pullman service for 23 years.

Albert H. Payson, assistant to the president of the Atchison, Topeka & Santa Fe, with headquarters at San Francisco, Cal., who died at San Mateo, Cal., on January 26, was born at Salem, Mass., on December 1, 1847, and graduated from the United States Military Academy in 1864. He entered railway service in 1868 on the San Francisco & San Joaquin Valley, serving in various capacities with that company, including that of vice-president, until its absorption by the Santa Fe in 1903. He was then apponited assistant to the president of the Santa Fe at San Francisco, a position he held until the time of his death. For various periods from 1903 until 1918, Mr. Payson also served as president of the Santa Fe & Northwestern and vice-president of its successor, the Northwestern Pacific.

James T. Robertson, general manager of the Cumberland & Pennsylvania, with headquarters at Cumberland, Md., died suddenly at his home on January 9, from cerebral hemorrhage, shortly after his removal from his office, where he was stricken. Mr. Robertson was born on March 29, 1872, at Ocean, Md. He was educated in the public schools, and entered

James T. Robertson

railway service with the Cumberland & Pennsylvania on May, 1890, as messenger boy at Lonaconing, Md. Later he served successively as telegraph operator, clerk in the general offices at Cumberland, Md., stenographer to the general freight and passenger agent, and to the superintendent, and chief clerk to general manager. In July, 1907, Mr. Robertson was promoted to the position of general passenger and freight agent. On February 21, 1911, he was appointed general manager, the position he held at the time of his death.

* * *

A Canadian National Train at the C. N. R.-T. & N. O. Union Station, Cochrane, Ont.